

3. RESULTS

This section discusses the results of compiling the contaminant inventory information for data form entries with a known quantity. Section 3.1 provides an introduction, summary rollup tables of the inventory over all generators, and explanatory information for the recent (1984–1993) and projected (1994–2003) time periods. Sections 3.2 through 3.7 present corresponding rollup tables and discussions for the six individual major waste generators for the same time periods.

Because Section 3 contains a very large number of tables, the tables are placed at the end of the section for the convenience of the reader.

Had there been entries whose contaminant quantities were "unknown" on the data forms, they would have been discussed in Section 4. However, no such entries resulted for the recent and projected time periods.

3.1 Introduction and Totals

3.1.1 Introduction and Conventions Followed

All information on the contaminant inventory and on the waste characteristics gathered in this task resides in the CIDRA database. Appendix B (Volumes 2 and 3 of this report) contains a complete printout of the information in CIDRA. For each of the 99 waste streams identified, the data forms provide the compiled information concerning the stream, the contaminant quantities and characteristics, the sources of information, and the assumptions made regarding the contaminants for the recent (1984–1993) and projected (1994–2003) time periods.

Tables 3-1 through 3-4 provide the total best-estimate quantities of each contaminant in the inventory, covering all waste streams from all generators. Tables 3-1 and 3-2 represent the nonradiological contaminants in terms of grams; Tables 3-3 and 3-4 list the radiological contaminants in terms of curies at the time of disposal.

These tables and all other tables of contaminant inventories in this section are given for the recent (1984–1993) and projected (1994–2003) time periods. The tables are designated with an "a" or "b." The "a" tables present the contaminants in the waste in order of best estimate quantity; the "b" tables, in alphabetical order.

The upper and lower bounds on the quantities of the contaminants are also given in the tables. Section 5 discusses the statistical methodology used for evaluating the uncertainties in the inventories and for calculating the upper and lower bounds. Section 5 also discusses the major sources of uncertainty, which vary depending on the waste generator and the time period, (i.e., recent or projected).

All inventories in this report are given to only two significant digits. The specification of more significant digits would give an erroneous impression of the accuracy to which the inventories can be estimated.

The task described in this report went beyond the compilation of an inventory based on waste-related records. The task also considered the technical adequacy of the measurement methods by which the inventory data were originally generated. As a result, although many (generally minor) revisions were made to the estimated contaminant quantities in individual waste streams, major "across-the-board" revisions, based on technical considerations, were also incorporated. As discussed primarily in Section 5, these revisions affect many waste streams. The total inventories in Tables 3-1 through 3-4 are, therefore, significantly different from the corresponding quantities reported in RWMIS and in waste generator forecasts. The differences and their bases are discussed in detail in Section 6.

A brief but important explanation is needed about the handling of radioactive decay products (progeny) in the inventory of radiological contaminants, e.g., in Tables 3-3 and 3-4. Because of radioactive decay, the progeny of radionuclides begin forming (growing in) as soon as the parent radionuclides are formed. The relative abundance of the progeny compared with that of the parent depends on the relative half-lives of the parent and progeny, and on the time elapsed since the production of the parent. For some radionuclides that are often predominant in waste inventories, the half-lives of the progeny are very short compared with those of the parents. Example combinations of parent and progeny are Sr-90 and Y-90, Cs-137 and Ba-137m (metastable), and Ru-106 and Rh-106m. In such cases, radioactive equilibrium (termed "secular equilibrium") is established very quickly (within hours or days) between the parent and the progeny. In these particular circumstances, each curie of the parent radionuclide is in equilibrium with one curie of the progeny (unless branching occurs).

Some of the preparers of the original shipping and other records included secular equilibrium considerations in the data entries, while others did not. In the present task, the inventories generally were not adjusted to reflect secular equilibrium. Instead, the adjustment was deferred to the risk assessment. This approach allows easier comparison of the inventory with previous inventory compilations. Adjustments for secular equilibrium will be made before using the inventory in the risk assessment and will be combined with the effort involving complete radioactive decay calculations. The abundance of the progeny will be calculated in computer codes developed for that purpose or in decay schemes built into environmental transport codes.

Because the subject progeny have very short half-lives, they exist only as long as the parent radionuclide exists. Therefore, omitting the progeny from the inventory at the time of waste disposal will not affect the inventory of the progeny used in the risk assessment, for times longer than a few days or weeks. The equilibrium that is quickly established in producing the progeny will be modeled in the radioactive decay equations.

For easier comparison of the inventory with previous inventory compilations, no effort was devoted to deleting radionuclides with very short half-lives. Again, complete calculations of radioactive decay will be performed before using the inventory in the risk assessment.

Although radioactive decay and ingrowth are not factored into this inventory and are deferred for evaluation in the risk assessment, one other nuclear physics consideration is factored into the inventory. The consideration is the relative percentages of U-234, U-235, and U-238 in uranium entries in the inventory. In natural uranium, the relative percentages of these radionuclides by mass are 0.0055%, 0.72%, and 99.2745%, respectively. By radioactivity, the

percentages are approximately 48%, 3%, and 49%, respectively. When natural uranium is enriched in the concentration of U-235 for use in nuclear reactors or weapons, in facilities designed for that purpose, the relative proportions of the three radionuclides change considerably. Many of the waste streams in the inventory contain uranium, but the records generally identified only the one or two uranium radionuclides that were predominant by mass. In the present study, a more thorough approach was taken for all streams listed in the records as containing >0.1 Ci of any of the three listed uranium radionuclides. For those streams, the degree of enrichment of the uranium (e.g., enrichment corresponding to that of depleted uranium, natural uranium, slightly enriched uranium, or highly enriched uranium) was estimated based on the source and nature of the waste. Standard curves (Rich et al. 1988; EG&G Idaho 1985) were consulted that indicate the relative proportions of the uranium radionuclides for various degrees of enrichment. The appropriate mixture of uranium radionuclides was then ascribed to the uranium in the waste stream, totaling the same amount of uranium as the records indicated.

Some contaminants (e.g., uranium) are not only radioactive, but they also present nonradiological hazards. Such contaminants are listed in this report under only the radiological heading. The nonradiological hazards of materials that are radioactive will be considered in the risk assessment.

As the titles of all the inventory tables for radiological contaminants indicate, the radioactivity is given as of the various times of disposal.

For each nonradiological contaminant in the tables, the CAS number is given.

The current inventory is not suitable for direct, immediate use in the risk assessment. As Figure 2-2 indicates, the risk assessor needs to apply additional calculations and judgment before using the inventory values in environmental transport codes and other risk assessment methods. Use of the information requires careful consideration of factors such as (a) the physical and chemical characteristics of individual waste streams and of contaminants within a waste stream, (b) waste packaging methods, (c) likely burial methods for the particular type of waste at the particular time, and (d) any migration of contaminants that might have occurred to date. A discussion of this evaluation process is beyond the scope of the present document.

3.1.2 Rollup of Nonradiological Contaminants Over All Generators

Table 3-1 lists the nonradiological contaminants identified in the inventory for the recent period. Lead estimated at 9.8E+07 g and beryllium at 6.3E+06 g are the principal contaminants. They are followed by asbestos estimated at 2.3E+06 g, copper at 2.3E+04 g, zirconium oxide at 4.5E+03 g, and chromium at 2.9E+01 g. Other contaminants present in very small quantities, ranging from 2.0 to 0.5 g, are mercury, cadmium, and arsenic.

In the projected time period (see Table 3-2), the principal contaminants are beryllium estimated at 5.0E+07 g, asbestos at 1.1E+06 g, and chromium at 1.9E+01 g. Barium, cadmium, lead, arsenic, and mercury are also present, but in very small quantities ranging from about 7 to 0.01 g.

The minimal amounts of nonradiological contaminants in the waste during the recent and projected periods reflect cessation of the receipt of mixed waste at the SDA, as discussed in Section 1.2. Lead was disposed of in the SDA as late as 1987, however, so a substantial quantity of lead was identified in the inventory for the recent period.

3.1.3 Rollup of Radiological Contaminants Over All Generators

Table 3-3 lists the radiological contaminants identified in the inventory for the recent time period (1984–1993). The estimated total inventory is 2.8 million Ci at the time of disposal. The largest entry is the activation product Co-60 at 1.4 million Ci, with a half-life of about 5 years. This contaminant constitutes about half of the activity in the waste. Other predominant activation products include Ni-63 at 480,000 Ci (100-year half-life), Co-58 at 200,000 Ci (half-life of less than 1 year) and Fe-55 at 160,000 Ci (2.7-year half-life).

The third largest entry is tritium (H-3) at 300,000 Ci. This constitutes about one-tenth of the activity in the waste. The vast majority of the H-3 was generated as an activation product in beryllium, as discussed in Section 2.5.2. Tritium has a half-life of about 12 years.

The predominant fission products include Cs-137 at 3,100 Ci, Sb-125 at 2,900 Ci, Sr-90 at 580 Ci, its decay product Y-90 at 200 Ci, and Ce-144 at 210 Ci.

As shown in Table 3-3, actinides (many of which are very long-lived) are present. Those with the largest activity are Pu-241 at 17 Ci and Th-228 at 10 Ci. Several others are present in very small activities, including Am-241, U-234, Pu-239, U-232, U-238, Ra-226, Pu-238, U-235, Cm-242, Cm-244, and Pu-240.

The activities of several of the radionuclides in Table 3-3 were estimated in this study almost exclusively by means of calculations with nuclear physics computer codes. (The calculations either were performed as part of this study or had been performed previously and were extracted from the reports referenced in Section 2.) These radionuclides were frequently not listed on shipping records because their radiation is difficult to detect. The radiation exhibits either weak or no gamma rays, and is often absorbed within the waste materials or the container walls. Examples of these radionuclides are H-3, C-14, Sr-90, Tc-99, and I-129. As Section 6.2 shows, the calculated activities of radionuclides of this type are larger than the corresponding activities indicated in the shipping record compilations of RWMIS.

Table 3-4 lists the radiological contaminants identified in the inventory for the projected time period (1994–2003). The total inventory is 3.8 million Ci at the projected times of disposal. The largest entry is tritium (H-3) at 2,600,000 Ci. This contaminant constitutes almost three-fourths of the activity in the waste. The vast majority of the H-3 is generated as an activation product in beryllium. Other predominant activation products are Co-60 at 790,000 Ci, Co-58 at 100,000 Ci, Ni-63 at 69,000 Ci, Mn-54 at 65,000 Ci, Fe-55 at 38,000 Ci, and Cr-51 at 26,000 Ci.

The predominant fission products include Cs-137 at 1,600 Ci, Sr-90 at 82 Ci, Eu-155 at 72 Ci, Y-90 at 69 Ci, and Ce-144 at 58 Ci.

As shown in Table 3-4, actinides are present: Pu-241 at 46 Ci and several others in smaller activities (e.g., Pu-239, Pu-238, Cm-242, and Am-241).

3.2 Test Area North

3.2.1 Nonradiological Contaminants

Table 3-5 indicates that lead was the only nonradiological contaminant in the TAN waste sent to the SDA in the 1984–1993 time period. The quantity was 5.4E+06 g. No nonradiological contaminants are anticipated for the 1994–2003 time period.

3.2.2 Radiological Contaminants

Tables 3-6 and 3-7 list the inventory of radiological contaminants in the waste from TAN for the time periods 1984–1993 and 1994–2003, respectively.

For 1984–1993, the best estimate for the total radioactivity is approximately 2,200 Ci. During this period, waste from TAN was contaminated principally with fission products from the TMI abnormal waste and fuel that DOE accepted to repackage, and store or dispose of. The LOFT reactor and primary coolant system components constituted a slight perturbation from this normal contamination distribution.

The chief radionuclides in the TAN waste were the fission products Cs-137, Sr-90, and Cs-134. These three fission products constituted approximately 90% of the activity. Most of the remaining activity is due to the activation products Ni-63, Co-60, Mn-54, and Fe-55. The nickel, cobalt, manganese, and iron originate in structural materials. These are relatively immobile. Plutonium and uranium radionuclides with very long half-lives are present in small activities.

For 1994–2003, the best estimate for the total radioactivity is approximately 1.5 Ci. The largest contributor, which accounts for almost half of the activity, is Cs-137. The next two largest contributors are Sr-90 and Cs-134. Uranium radionuclides are present in very small activities.

3.3 Test Reactor Area

3.3.1 Nonradiological Contaminants

Tables 3-8 and 3-9 list the inventory of nonradiological contaminants in the waste from TRA for the 1984–1993 and 1994–2003 time periods, respectively. Beryllium, at 6.3 million g, is the largest contributor for the period 1984–1993 and the sole contributor for the 1994–2003 period at 50 million g. The beryllium represents the mass of the beryllium reflectors removed from the ATR reactor during the time period 1984–1993 and the projected mass for the 1994–2003 time period.

During 1987, about 1.6E+06 g of lead was sent to the RWMC from TRA. This lead was probably buried in the SDA (Rodgers 1986, Rodgers 1987). An exception to the prohibition on burying mixed waste in the SDA was allowed until December 31, 1987. This exception permitted

lead shielding to be buried at the SDA along with the waste it shielded. Contaminated and clean lead shipped after 1987 is temporarily stored above ground at the RWMC so that it can be retrieved for reuse, decontamination, or recycling.

3.3.2 Radiological Contaminants

Tables 3-10 and 3-11 list the inventory of radiological contaminants in the waste from TRA for the 1984–1993 and 1994–2003 time periods, respectively.

For 1984–1993, the best estimate for the total radioactivity is approximately 320,000 Ci. Tritium (H-3) is the dominant radionuclide in the TRA waste, constituting about 91% of the activity in the waste at 290,000 Ci. Tritium was an activation product formed in the beryllium reflectors in the reactor cores. Tritium was also formed as a fission product of ternary fission.

Other major contributors are the activation products Co-60, Fe-55, Ni-63, and Cr-51, and the fission products Cs-137, Ce-144, Cs-134, Sb-125, and Sr-90. The dominant radionuclides in the TRA waste are what would generally be expected based on the nature of the reactor operations that generated the waste.

TRA is the principal generator of three radionuclides that are of particular interest because of their very long half-lives and relatively high mobilities in groundwater, even though their activities are not large: C-14, Tc-99, and I-129. As discussed in Section 2.5.2, the estimated activities of these three radionuclides are based primarily on (a) nuclear physics calculations performed for the current task and (b) Tables 2-5 through 2-7, which in turn derive from calculations and laboratory data obtained at the INEL and at the Electric Power Research Institute (EPRI) (see Harker 1995a and 1995b). The activities are considerably higher than those listed in the shipping records for these three radionuclides, because the activities are not measured in routine surveys and are, therefore, not listed in most shipping records. There is considerable uncertainty in the present estimates.

Another radionuclide of potential interest in the TRA waste is Nb-94. This radionuclide is formed by neutron activation of niobium collars that are attached to the beryllium reflectors from ATR. Nb-94 is small in activity but very long-lived. Ongoing studies, separate from this effort, are refining the estimated activity of Nb-94. When the ongoing studies are completed, the potential effect on this inventory and on risk assessments using this inventory will be evaluated.

For 1994–2003, the best estimate for the total radioactivity is approximately 2.8 million Ci. Tritium is the dominant radionuclide, constituting about 94% of the activity. The radionuclide distribution is similar to that for the period 1984–1993.

3.4 Idaho Chemical Processing Plant

3.4.1 Nonradiological Contaminants

Table 3-12 lists the inventory of nonradiological contaminants in waste from ICPP for the recent time period (1984–1993). The nonradiological contaminants were lead at 78 million g and asbestos at 1.2 million g. The lead was primarily in the form of lead sheets and lead bricks that

had been used for shielding, and the asbestos was from insulation. Usually, the insulation was removed and disposed of during modification of a building or as part of an asbestos abatement program.

No organic or inorganic liquids were sent to the SDA from ICPP during the period 1984–1993, unlike the period 1952–1983 when many thousands of gallons were disposed of in an area that eventually became part of the SDA (LITCO 1995).

No nonradiological contaminants from ICPP are expected to be disposed of in the SDA in the period 1994–2003.

3.4.2 Radiological Contaminants

Tables 3-13 and 3-14 list the inventory of radiological contaminants in the waste from ICPP for the 1984–1993 and 1994–2003 time periods, respectively.

For the 1984–1993 period, the total best-estimate radioactivity is approximately 670 Ci. The radiological contaminants are primarily fission products that were released from the fuel elements during chemical processing. The dominant fission products are Ce-144, Pr-144, Cs-137, Sr-90, Y-90, Ru-106, and Rh-106. This 670 Ci is much less than the activity sent during the period 1952–1983. This reduction in activity reflects changes in programs and in methods for handling the waste. For example, no end boxes were cut from fuel elements and shipped to the SDA in the period 1984–1993, since they were removed at the reactor facility before the fuel was shipped to ICPP. The end box waste stream produced approximately 500,000 Ci for disposal in the 1952–1983 period.

The activity in the ICPP waste for 1994–2003 is expected to be even less than for the 1984–1993 period. An estimated 160 Ci is projected. This reduction reflects the increased emphasis on minimization of waste and changes in programs.

3.5 Naval Reactors Facility

3.5.1 Nonradiological Contaminants

Table 3-15 lists the nonradiological contaminants in the NRF-generated waste buried in the SDA during the 1984–1993 time period. The lead at 640,000 g is from radionuclide-contaminated lead shielding, and the asbestos at 580,000 g is from pipe insulation.

No nonradiological contaminants are expected to be disposed of in the SDA in NRF waste for 1994–2003.

3.5.2 Radiological Contaminants

Tables 3-16 and 3-17 list the inventory of radionuclide contaminants in the waste from NRF for the 1984–1993 and 1994–2003 time periods, respectively.

For the 1984–1993 period, the total best-estimate is approximately 970,000 Ci. The majority of the activity is from the activation products Ni-63 (about half of the activity), Co-60 (about one-fourth of the activity) and Fe-55 (about 15% of the activity). The other major contributors are Co-58, Ta-182, Sn-119m, W-185, and Nb-95.

The majority of the radioactivity in the waste from NRF is in the form of solid, monolithic pieces of activated metal (core structural materials). In addition, significant fractions of the activity are short-lived radionuclides and some of that activity has decayed since burial. The activation products such as Ni-63, Co-60, and Fe-55 are entrapped in large pieces of stainless steel.

The radionuclides and their activities are what one would expect to see in the waste from a reactor facility such as NRF. From the reactors, one would expect to see compactible waste with small concentrations of activated metals. From ECF, one would expect to see activated metals associated with core structural materials and some fission products resulting from the examination of fuel samples.

The best-estimate activity for the 1994–2003 time period is approximately 140,000 Ci. The distribution is similar to that for the period 1984–1993. Ni-63 and Co-60 are each about one-third and Fe-55 is about 20% of the total activity. The same conclusions can be drawn regarding half-lives and mobility. The lower total activity relative to the previous periods reflects a projected decreasing level of naval fuel examination work over the coming decade.

3.6 Argonne National Laboratory—West

3.6.1 Nonradiological Contaminants

Tables 3-18 and 3-19 list the inventory of nonradiological contaminants in the waste from ANL-W for the 1984–1993 and 1994–2003 time periods, respectively.

For 1984–1993, the primary nonradiological contaminants were lead at 9.5 million g and asbestos at 410,000 g. The lead was used for shielding inside inserts. Asbestos is not classified as hazardous waste per RCRA; therefore, asbestos contaminated with radionuclides is still acceptable for burial at the SDA. It was generated primarily during facility maintenance and modification operations. Asbestos waste resulted from the removal of insulation, pipe lagging, laboratory counter tops, and other asbestos-containing materials.

Except for the virtual disappearance of lead from the inventory, the nonradiological contaminants in the ANL-W waste for 1994–2003 are similar to those for the 1984–1993 time period. The asbestos, which is the predominant contaminant at 100,000 g, is a result of D&D efforts, and facility maintenance and modifications.

3.6.2 Radiological Contaminants

Tables 3-20 and 3-21 list the inventory of radiological contaminants in the waste from ANL-W for the 1984–1993 and 1994–2003 time periods, respectively.

The best estimate for the total radioactivity in 1984–1993 is approximately 1.5 million Ci. During this time period, the largest contributors to the activity are activation products. Co-60 makes up about three-fourths of the activity with 1.1 million Ci. The next two largest contributors are Co-58 at 180,000 Ci and Mn-54 at 120,000 Ci. Other key activation products are Cr-51, Fe-59, and H-3. The predominant fission products include Sr-90, Cs-137, Y-90, and Ce-144. Long-lived radionuclides are present in small activities, e.g., U-234, Pu-239, U-238, and U-235.

For 1994–2003, most of the waste produced is from D&D. The best estimate for the total radioactivity is approximately 810,000 Ci. The distribution of the radionuclides in the waste for this time period is similar to that in 1984–1993. The largest contributor to the activity is Co-60 at 620,000 Ci. The next two largest contributors are Co-58 at 97,000 Ci and Mn-54 at 65,000 Ci. Other key radionuclides in terms of activity are Cr-51 and Fe-59.

3.7 Other Generators

Inventories for nine waste generators are reported in this section. These are Argonne National Laboratory—East (designated ALE); Auxiliary Reactor Area (ARA); Combustion Engineering—General Atomic (CEG); Central Facilities Area (CFA); Decontamination and Decommissioning projects (D&D); environmental restoration projects (ERP); Power Burst Facility (PBF); Waste Experimental Reduction Facility (WER); and Waste Management Complex (WMC). These are known collectively as the "other" generators.

3.7.1 Nonradiological Contaminants

Tables 3-22 and 3-23 list the combined inventories of nonradiological contaminants in waste from the other generators for the recent period (1984–1993) and the projected period (1994–2003), respectively.

For the recent time period, the only generators of the nonradiological contaminants were PBF and the D&D projects. The principal contaminants were lead at 2.5 million g and asbestos at 75,000 g. Small amounts of arsenic, cadmium, chromium, mercury, and lead were constituents of sludge removed from the waste holdup tank at the SPERT-IV reactor site. This sludge was mixed with Portland cement for disposal. The copper was in the form of electrical wire.

The only nonradiological contaminant projected for the time period 1994–2003 is asbestos at 1 million g from ARA. The asbestos is from the disassembly and removal of facilities at ARA-I, ARA-II, and ARA-III.

3.7.2 Radiological Contaminants

Tables 3-24 and 3-25 list the combined inventory of radiological contaminants in the waste from other generators for the periods 1984–1993 and 1994–2003, respectively.

For 1984–1993, the total best estimate is approximately 3,200 Ci. The predominant radionuclide is H-3 at 2,800 Ci, primarily from experiments at ALE and CEG. Small amounts of other radionuclides were present, including Cs-137 at 270 Ci, Sr-90 at 49 Ci, and Cs-134 at 25 Ci.

During the 1994–2003 period, the total best estimate is approximately 510 Ci, primarily from projected D&D operations. The predominant radionuclides are the activation products Co-60 at 190 Ci and Ni-63 at 130 Ci. The fission products Cs-137, Ce-144, Sr-90, and Y-90 are also present in smaller amounts. H-3 is projected at 23 Ci. These radionuclides account for approximately 95% of the total activity in the waste. No waste is anticipated from ALE (it has not shipped waste to the INEL since 1988). CEG also is not a contributor in this timeframe, as the waste from this generator was produced from experiments associated with the NPR project, which has been canceled. PBF is not a contributor either, as waste from PBF is projected to contain insignificant radioactivity in comparison to the other generators. This assumes that PBF remains shut down and inactivation of the PBF reactor does not occur.

Table 3-1a. Inventory of nonradiological contaminants (listed by quantity) from all generators for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7439-92-1	Lead	9.8E+07	8.2E+07	1.1E+08
7440-41-7	Beryllium	6.3E+06	6.3E+06	6.4E+06
1332-21-4	Asbestos	2.3E+06	1.6E+06	3.2E+06
7440-50-8	Copper	2.3E+04	7.9E+03	5.2E+04
1314-23-4	Zirconium oxide	4.5E+03	3.9E+03	5.3E+03
7440-47-3	Chromium	2.9E+01	1.7E+01	4.6E+01
7439-97-6	Mercury	2.0E+00	1.2E+00	3.2E+00
7440-43-9	Cadmium	1.8E+00	1.5E+00	2.0E+00
7440-38-2	Arsenic	5.0E-01	3.0E-01	7.9E-01

Table 3-1b. Inventory of nonradiological contaminants (listed alphabetically) from all generators for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-38-2	Arsenic	5.0E-01	3.0E-01	7.9E-01
1332-21-4	Asbestos	2.3E+06	1.6E+06	3.2E+06
7440-41-7	Beryllium	6.3E+06	6.3E+06	6.4E+06
7440-43-9	Cadmium	1.8E+00	1.5E+00	2.0E+00
7440-47-3	Chromium	2.9E+01	1.7E+01	4.6E+01
7440-50-8	Copper	2.3E+04	7.9E+03	5.2E+04
7439-92-1	Lead	9.8E+07	8.2E+07	1.1E+08
7439-97-6	Mercury	2.0E+00	1.2E+00	3.2E+00
1314-23-4	Zirconium oxide	4.5E+03	3.9E+03	5.3E+03

Table 3-2a. Inventory of nonradiological contaminants (listed alphabetically) from all generators for the years 1994–2003.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-41-7	Beryllium	5.0E+07	5.0E+07	5.1E+07
1332-21-4	Asbestos	1.1E+06	4.2E+05	2.4E+06
7440-47-3	Chromium	1.9E+01	1.1E+01	3.0E+01
7440-39-3	Barium	7.3E+00	4.3E+00	1.2E+01
7440-43-9	Cadmium	5.8E+00	3.8E+00	8.6E+00
7439-92-1	Lead	1.6E+00	1.3E+00	2.0E+00
7440-38-2	Arsenic	2.1E-01	1.2E-01	3.3E-01
7439-97-6	Mercury	1.3E-02	1.1E-02	1.5E-02

Table 3-2b. Inventory of nonradiological contaminants (listed alphabetically) from all generators for the years 1994–2003.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-38-2	Arsenic	2.1E-01	1.2E-01	3.3E-01
1332-21-4	Asbestos	1.1E+06	4.2E+05	2.4E+06
7440-39-3	Barium	7.3E+00	4.3E+00	1.2E+01
7440-41-7	Beryllium	5.0E+07	5.0E+07	5.1E+07
7440-43-9	Cadmium	5.8E+00	3.8E+00	8.6E+00
7440-47-3	Chromium	1.9E+01	1.1E+01	3.0E+01
7439-92-1	Lead	1.6E+00	1.3E+00	2.0E+00
7439-97-6	Mercury	1.3E-02	1.1E-02	1.5E-02

Table 3-3a. Inventory of radiological contaminants (listed by quantity) from all generators for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Co-60	1.4E+06	50.8	9.3E+05	2.0E+06
Ni-63	4.8E+05	17.2	4.3E+05	5.2E+05
H-3	3.0E+05	10.7	1.0E+05	6.8E+05
Co-58	2.0E+05	7.1	2.5E+04	7.5E+05
Fe-55	1.6E+05	5.7	1.4E+05	1.8E+05
Mn-54	1.2E+05	4.2	1.2E+04	4.8E+05
Cr-51	4.7E+04	1.7	5.4E+03	1.9E+05
Ta-182	1.8E+04	0.6	1.6E+04	2.0E+04
Fe-59	1.5E+04	0.5	1.5E+03	6.0E+04
Sn-119m	8.8E+03	0.3	7.6E+03	1.0E+04
W-185	6.4E+03	0.2	5.6E+03	7.3E+03
Nb-95	3.8E+03	0.1	2.6E+03	5.4E+03
Hf-181	3.4E+03	0.1	3.0E+03	3.9E+03
Cs-137	3.1E+03	0.1	1.1E+03	7.0E+03
Sb-125	2.9E+03	0.1	2.4E+03	3.4E+03
Hf-175	2.8E+03	0.1	2.5E+03	3.2E+03
Zr-95	2.1E+03	0.1	1.4E+03	3.0E+03
Ni-59	1.4E+03	<0.05	1.1E+03	1.8E+03
Zn-65	1.0E+03	<0.05	8.5E+00	7.2E+03
Sr-90	5.8E+02	<0.05	4.4E+01	2.6E+03
Ce-144	2.1E+02	<0.05	3.9E+01	6.8E+02
Y-90	2.0E+02	<0.05	3.5E+01	6.7E+02
Cs-134	1.4E+02	<0.05	6.1E+00	7.7E+02
Sn-117m	1.2E+02	<0.05	6.1E-01	8.7E+02
Pr-144	1.1E+02	<0.05	1.9E+01	3.7E+02
Ru-106	6.4E+01	<0.05	1.3E+01	2.0E+02
Rh-106	6.1E+01	<0.05	1.1E+01	2.0E+02

Table 3-3a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Sc-46	5.0E+01	<0.05	2.6E-01	3.6E+02
Te-125m	4.2E+01	<0.05	2.2E-01	3.0E+02
C-14	4.0E+01	<0.05	4.1E-01	2.8E+02
Eu-155	3.9E+01	<0.05	5.1E-01	2.6E+02
Sn-113	2.4E+01	<0.05	2.1E-01	1.7E+02
Pu-241	1.7E+01	<0.05	1.0E-01	1.2E+02
Th-228	1.0E+01	<0.05	8.4E+00	1.2E+01
Ba-137m	4.6E+00	<0.05	3.0E+00	6.8E+00
Eu-152	4.1E+00	<0.05	2.0E-01	2.2E+01
Am-241	3.7E+00	<0.05	2.7E-02	2.6E+01
U-234	3.5E+00	<0.05	3.3E+00	3.7E+00
Eu-154	3.3E+00	<0.05	3.5E-01	1.4E+01
Sr-89	3.0E+00	<0.05	3.7E-02	2.0E+01
Ce-141	2.9E+00	<0.05	5.4E-02	1.8E+01
La-140	2.8E+00	<0.05	4.9E-02	1.8E+01
Na-24	2.7E+00	<0.05	2.0E-02	1.9E+01
Ba-140	2.4E+00	<0.05	4.1E-02	1.6E+01
Pu-239	2.4E+00	<0.05	2.4E-01	1.0E+01
Pm-147	2.4E+00	<0.05	1.2E-02	1.7E+01
U-232	2.2E+00	<0.05	1.8E+00	2.7E+00
Ag-110	1.9E+00	<0.05	1.0E-02	1.4E+01
U-238	1.6E+00	<0.05	1.6E+00	1.7E+00
Co-57	1.5E+00	<0.05	8.6E-02	7.8E+00
Mn-56	1.3E+00	<0.05	6.6E-03	9.5E+00
Gd-153	1.3E+00	<0.05	1.1E-02	9.2E+00
Ra-226	1.1E+00	<0.05	8.7E-01	1.4E+00
I-132	1.0E+00	<0.05	5.6E-03	7.3E+00

Table 3-3a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ir-192	6.6E-01	<0.05	5.4E-03	4.6E+00
Na-22	5.4E-01	<0.05	3.6E-02	2.6E+00
Tc-99	5.0E-01	<0.05	2.8E-03	3.6E+00
Pu-238	3.6E-01	<0.05	8.5E-03	2.2E+00
Nb-94	2.0E-01	<0.05	8.9E-04	1.5E+00
V-48	2.0E-01	<0.05	4.4E-03	1.2E+00
Ru-103	1.9E-01	<0.05	2.5E-03	1.3E+00
U-235	1.6E-01	<0.05	1.5E-01	1.6E-01
I-131	1.1E-01	<0.05	2.2E-03	7.2E-01
Y-93	1.1E-01	<0.05	5.6E-04	8.0E-01
Cm-242	8.8E-02	<0.05	6.8E-04	6.2E-01
In-113m	8.2E-02	<0.05	4.4E-03	4.2E-01
Cm-244	7.6E-02	<0.05	5.2E-04	5.4E-01
Pu-240	5.7E-02	<0.05	2.4E-03	3.1E-01
Se-75	4.5E-02	<0.05	8.0E-04	2.9E-01
Au-198	2.4E-02	<0.05	1.3E-03	1.2E-01
Mo-99	2.3E-02	<0.05	1.6E-04	1.6E-01
Ag-110m	1.8E-02	<0.05	1.3E-04	1.2E-01
Sb-124	1.1E-02	<0.05	2.4E-04	7.1E-02
Cd-109	1.1E-02	<0.05	5.6E-05	7.9E-02
Re-188	9.3E-03	<0.05	4.7E-05	6.8E-02
Te-132	5.6E-03	<0.05	3.3E-04	2.8E-02
Sr-91	4.4E-03	<0.05	2.2E-05	3.2E-02
Np-237	3.7E-03	<0.05	2.2E-05	2.7E-02
Y-88	3.0E-03	<0.05	1.5E-05	2.2E-02
U-236	2.3E-03	<0.05	1.1E-03	4.1E-03
I-129	2.1E-03	<0.05	3.1E-05	1.4E-02

Table 3-3a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Sr-92	1.6E-03	<0.05	8.2E-06	1.2E-02
I-133	1.5E-03	<0.05	7.6E-06	1.1E-02
Br-82	1.0E-03	<0.05	5.1E-06	7.3E-03
Ce-139	3.0E-04	<0.05	1.5E-06	2.2E-03
Ag-108m	1.1E-07	<0.05	5.5E-10	7.7E-07
Pu-242	1.2E-08	<0.05	6.0E-11	8.9E-08
Total	2.8E+06	99.6		

Table 3-3b. Inventory of radiological contaminants (listed alphabetically) from all generators for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ag-108m	1.1E-07	<0.05	5.5E-10	7.7E-07
Ag-110	1.9E+00	<0.05	1.0E-02	1.4E+01
Ag-110m	1.8E-02	<0.05	1.3E-04	1.2E-01
Am-241	3.7E+00	<0.05	2.7E-02	2.6E+01
Au-198	2.4E-02	<0.05	1.3E-03	1.2E-01
Ba-137m	4.6E+00	<0.05	3.0E+00	6.8E+00
Ba-140	2.4E+00	<0.05	4.1E-02	1.6E+01
Br-82	1.0E-03	<0.05	5.1E-06	7.3E-03
C-14	4.0E+01	<0.05	4.1E-01	2.8E+02
Cd-109	1.1E-02	<0.05	5.6E-05	7.9E-02
Ce-139	3.0E-04	<0.05	1.5E-06	2.2E-03
Ce-141	2.9E+00	<0.05	5.4E-02	1.8E+01
Ce-144	2.1E+02	<0.05	3.9E+01	6.8E+02
Cm-242	8.8E-02	<0.05	6.8E-04	6.2E-01
Cm-244	7.6E-02	<0.05	5.2E-04	5.4E-01
Co-57	1.5E+00	<0.05	8.6E-02	7.8E+00
Co-58	2.0E+05	7.1	2.5E+04	7.5E+05
Co-60	1.4E+06	50.8	9.3E+05	2.0E+06
Cr-51	4.7E+04	1.7	5.4E+03	1.9E+05
Cs-134	1.4E+02	<0.05	6.1E+00	7.7E+02
Cs-137	3.1E+03	0.1	1.1E+03	7.0E+03
Eu-152	4.1E+00	<0.05	2.0E-01	2.2E+01
Eu-154	3.3E+00	<0.05	3.5E-01	1.4E+01
Eu-155	3.9E+01	<0.05	5.1E-01	2.6E+02
Fe-55	1.6E+05	5.7	1.4E+05	1.8E+05
Fe-59	1.5E+04	0.5	1.5E+03	6.0E+04
Gd-153	1.3E+00	<0.05	1.1E-02	9.2E+00

Table 3-3b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
H-3	3.0E+05	10.7	1.0E+05	6.8E+05
Hf-181	3.4E+03	0.1	3.0E+03	3.9E+03
Hf-175	2.8E+03	0.1	2.5E+03	3.2E+03
I-129	2.1E-03	<0.05	3.1E-05	1.4E-02
I-131	1.1E-01	<0.05	2.2E-03	7.2E-01
I-132	1.0E+00	<0.05	5.6E-03	7.3E+00
I-133	1.5E-03	<0.05	7.6E-06	1.1E-02
In-113m	8.2E-02	<0.05	4.4E-03	4.2E-01
Ir-192	6.6E-01	<0.05	5.4E-03	4.6E+00
La-140	2.8E+00	<0.05	4.9E-02	1.8E+01
Mn-54	1.2E+05	4.2	1.2E+04	4.8E+05
Mn-56	1.3E+00	<0.05	6.6E-03	9.5E+00
Mo-99	2.3E-02	<0.05	1.6E-04	1.6E-01
Na-22	5.4E-01	<0.05	3.6E-02	2.6E+00
Na-24	2.7E+00	<0.05	2.0E-02	1.9E+01
Nb-94	2.0E-01	<0.05	8.9E-04	1.5E+00
Nb-95	3.8E+03	0.1	2.6E+03	5.4E+03
Ni-59	1.4E+03	<0.05	1.1E+03	1.8E+03
Ni-63	4.8E+05	17.2	4.3E+05	5.2E+05
Np-237	3.7E-03	<0.05	2.2E-05	2.7E-02
Pm-147	2.4E+00	<0.05	1.2E-02	1.7E+01
Pr-144	1.1E+02	<0.05	1.9E+01	3.7E+02
Pu-238	3.6E-01	<0.05	8.5E-03	2.2E+00
Pu-239	2.4E+00	<0.05	2.4E-01	1.0E+01
Pu-240	5.7E-02	<0.05	2.4E-03	3.1E-01
Pu-241	1.7E+01	<0.05	1.0E-01	1.2E+02
Pu-242	1.2E-08	<0.05	6.0E-11	8.9E-08

Table 3-3b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ra-226	1.1E+00	<0.05	8.7E-01	1.4E+00
Re-188	9.3E-03	<0.05	4.7E-05	6.8E-02
Rh-106	6.1E+01	<0.05	1.1E+01	2.0E+02
Ru-103	1.9E-01	<0.05	2.5E-03	1.3E+00
Ru-106	6.4E+01	<0.05	1.3E+01	2.0E+02
Sb-124	1.1E-02	<0.05	2.4E-04	7.1E-02
Sb-125	2.9E+03	0.1	2.4E+03	3.4E+03
Sc-46	5.0E+01	<0.05	2.6E-01	3.6E+02
Se-75	4.5E-02	<0.05	8.0E-04	2.9E-01
Sn-113	2.4E+01	<0.05	2.1E-01	1.7E+02
Sn-117m	1.2E+02	<0.05	6.1E-01	8.7E+02
Sn-119m	8.8E+03	0.3	7.6E+03	1.0E+04
Sr-89	3.0E+00	<0.05	3.7E-02	2.0E+01
Sr-90	5.8E+02	<0.05	4.4E+01	2.6E+03
Sr-91	4.4E-03	<0.05	2.2E-05	3.2E-02
Sr-92	1.6E-03	<0.05	8.2E-06	1.2E-02
Ta-182	1.8E+04	0.6	1.6E+04	2.0E+04
Tc-99	5.0E-01	<0.05	2.8E-03	3.6E+00
Te-125m	4.2E+01	<0.05	2.2E-01	3.0E+02
Te-132	5.6E-03	<0.05	3.3E-04	2.8E-02
Th-228	1.0E+01	<0.05	8.4E+00	1.2E+01
U-232	2.2E+00	<0.05	1.8E+00	2.7E+00
U-234	3.5E+00	<0.05	3.3E+00	3.7E+00
U-235	1.6E-01	<0.05	1.5E-01	1.6E-01
U-236	2.3E-03	<0.05	1.1E-03	4.1E-03
U-238	1.6E+00	<0.05	1.6E+00	1.7E+00
V-48	2.0E-01	<0.05	4.4E-03	1.2E+00

Table 3-3b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
W-185	6.4E+03	0.2	5.6E+03	7.3E+03
Y-88	3.0E-03	<0.05	1.5E-05	2.2E-02
Y-90	2.0E+02	<0.05	3.5E+01	6.7E+02
Y-93	1.1E-01	<0.05	5.6E-04	8.0E-01
Zn-65	1.0E+03	<0.05	8.5E+00	7.2E+03
Zr-95	2.1E+03	0.1	1.4E+03	3.0E+03
Total	2.8E+06	99.6		

Table 3-4a. Inventory of radiological contaminants (listed by quantity) from all generators for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
H-3	2.6E+06	70.4	1.3E+06	5.0E+06
Co-60	7.9E+05	21.0	3.1E+05	1.7E+06
Co-58	1.0E+05	2.7	5.9E+03	5.0E+05
Ni-63	6.9E+04	1.8	2.5E+04	1.5E+05
Mn-54	6.5E+04	1.7	3.5E+03	3.3E+05
Fe-55	3.8E+04	1.0	1.7E+04	7.6E+04
Cr-51	2.6E+04	0.7	1.6E+03	1.3E+05
Fe-59	8.1E+03	0.2	4.4E+02	4.1E+04
Ta-182	7.6E+03	0.2	2.4E+03	1.8E+04
Nb-95	6.8E+03	0.2	2.2E+03	1.6E+04
Zr-95	3.2E+03	0.1	1.0E+03	7.7E+03
Cs-137	1.6E+03	<0.05	6.3E+02	3.3E+03
Ni-59	1.9E+02	<0.05	1.9E+00	1.3E+03
C-14	9.5E+01	<0.05	7.4E+00	4.3E+02
Sr-90	8.2E+01	<0.05	1.1E+01	3.1E+02
Eu-155	7.2E+01	<0.05	4.4E+00	3.5E+02
Y-90	6.9E+01	<0.05	7.0E+00	2.9E+02
Ce-144	5.8E+01	<0.05	7.2E+00	2.3E+02
Pu-241	4.6E+01	<0.05	3.0E+00	2.2E+02
Cs-134	5.0E+00	<0.05	8.5E-01	1.7E+01
Sb-125	4.1E+00	<0.05	3.7E-01	1.8E+01
Pr-144	2.6E+00	<0.05	2.5E-01	1.1E+01
Nb-94	1.9E+00	<0.05	1.9E-02	1.3E+01
Eu-154	1.4E+00	<0.05	1.6E-01	5.5E+00
Tc-99	1.4E+00	<0.05	8.6E-02	6.7E+00
Ir-192	1.4E+00	<0.05	1.4E-01	5.7E+00
Zn-65	1.2E+00	<0.05	6.5E-02	6.1E+00

Table 3-4a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ba-137m	1.1E+00	<0.05	6.1E-03	8.0E+00
Eu-152	6.9E-01	<0.05	3.8E-02	3.5E+00
Pu-239	4.2E-01	<0.05	2.7E-02	2.0E+00
Pu-238	4.1E-01	<0.05	2.6E-02	2.0E+00
Ru-106	4.0E-01	<0.05	3.4E-02	1.8E+00
Rh-106	3.9E-01	<0.05	3.2E-02	1.7E+00
Cm-242	2.2E-01	<0.05	1.6E-02	1.0E+00
Am-241	2.1E-01	<0.05	1.3E-02	1.0E+00
Cm-244	1.9E-01	<0.05	1.2E-02	9.3E-01
Hf-181	1.6E-01	<0.05	8.8E-03	8.3E-01
Ag-108	1.6E-01	<0.05	5.2E-03	9.4E-01
Ce-141	1.4E-01	<0.05	8.1E-03	6.7E-01
Co-57	1.2E-01	<0.05	4.5E-03	6.8E-01
La-140	1.1E-01	<0.05	6.5E-03	5.4E-01
Na-22	1.1E-01	<0.05	6.1E-03	5.5E-01
Sn-113	6.3E-02	<0.05	3.7E-03	3.1E-01
In-113m	5.4E-02	<0.05	3.1E-03	2.7E-01
U-238	5.2E-02	<0.05	3.2E-02	7.8E-02
I-129	5.1E-02	<0.05	6.2E-03	2.0E-01
U-234	5.0E-02	<0.05	3.1E-02	7.6E-02
Pu-240	4.5E-02	<0.05	3.0E-03	2.2E-01
Ba-140	4.2E-02	<0.05	1.5E-03	2.4E-01
Sc-46	3.7E-02	<0.05	2.0E-03	1.9E-01
Sn-117m	3.4E-02	<0.05	2.0E-03	1.7E-01
I-131	2.5E-02	<0.05	1.5E-03	1.2E-01
Mo-99	2.4E-02	<0.05	1.3E-03	1.2E-01
Np-237	1.7E-02	<0.05	4.3E-04	1.0E-01

Table 3-4a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ru-103	1.6E-02	<0.05	8.8E-04	8.2E-02
Au-198	1.6E-02	<0.05	9.0E-04	8.0E-02
Se-75	9.4E-03	<0.05	5.1E-04	4.8E-02
U-236	6.0E-03	<0.05	2.9E-03	1.1E-02
Te-132	2.9E-03	<0.05	1.6E-04	1.5E-02
Sb-124	2.4E-03	<0.05	1.3E-04	1.2E-02
U-235	1.7E-03	<0.05	1.3E-03	2.3E-03
Ag-110m	9.7E-04	<0.05	5.2E-05	4.9E-03
Sr-89	5.4E-04	<0.05	2.9E-05	2.7E-03
Xe-133	5.0E-04	<0.05	2.7E-05	2.5E-03
Total	3.8E+06	100.0		

Table 3-4b. Inventory of radiological contaminants (listed alphabetically) from all generators for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ag-108	1.6E-01	<0.05	5.2E-03	9.4E-01
Ag-110m	9.7E-04	<0.05	5.2E-05	4.9E-03
Am-241	2.1E-01	<0.05	1.3E-02	1.0E+00
Au-198	1.6E-02	<0.05	9.0E-04	8.0E-02
Ba-137m	1.1E+00	<0.05	6.1E-03	8.0E+00
Ba-140	4.2E-02	<0.05	1.5E-03	2.4E-01
C-14	9.5E+01	<0.05	7.4E+00	4.3E+02
Ce-141	1.4E-01	<0.05	8.1E-03	6.7E-01
Ce-144	5.8E+01	<0.05	7.2E+00	2.3E+02
Cm-242	2.2E-01	<0.05	1.6E-02	1.0E+00
Cm-244	1.9E-01	<0.05	1.2E-02	9.3E-01
Co-57	1.2E-01	<0.05	4.5E-03	6.8E-01
Co-58	1.0E+05	2.7	5.9E+03	5.0E+05
Co-60	7.9E+05	21.0	3.1E+05	1.7E+06
Cr-51	2.6E+04	0.7	1.6E+03	1.3E+05
Cs-134	5.0E+00	<0.05	8.5E-01	1.7E+01
Cs-137	1.6E+03	<0.05	6.3E+02	3.3E+03
Eu-152	6.9E-01	<0.05	3.8E-02	3.5E+00
Eu-154	1.4E+00	<0.05	1.6E-01	5.5E+00
Eu-155	7.2E+01	<0.05	4.4E+00	3.5E+02
Fe-55	3.8E+04	1.0	1.7E+04	7.6E+04
Fe-59	8.1E+03	0.2	4.4E+02	4.1E+04
H-3	2.6E+06	70.4	1.3E+06	5.0E+06
Hf-181	1.6E-01	<0.05	8.8E-03	8.3E-01
I-129	5.1E-02	<0.05	6.2E-03	2.0E-01
I-131	2.5E-02	<0.05	1.5E-03	1.2E-01
In-113m	5.4E-02	<0.05	3.1E-03	2.7E-01

Table 3-4b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ir-192	1.4E+00	<0.05	1.4E-01	5.7E+00
La-140	1.1E-01	<0.05	6.5E-03	5.4E-01
Mn-54	6.5E+04	1.7	3.5E+03	3.3E+05
Mo-99	2.4E-02	<0.05	1.3E-03	1.2E-01
Na-22	1.1E-01	<0.05	6.1E-03	5.5E-01
Nb-94	1.9E+00	<0.05	1.9E-02	1.3E+01
Nb-95	6.8E+03	0.2	2.2E+03	1.6E+04
Ni-59	1.9E+02	<0.05	1.9E+00	1.3E+03
Ni-63	6.9E+04	1.8	2.5E+04	1.5E+05
Np-237	1.7E-02	<0.05	4.3E-04	1.0E-01
Pr-144	2.6E+00	<0.05	2.5E-01	1.1E+01
Pu-238	4.1E-01	<0.05	2.6E-02	2.0E+00
Pu-239	4.2E-01	<0.05	2.7E-02	2.0E+00
Pu-240	4.5E-02	<0.05	3.0E-03	2.2E-01
Pu-241	4.6E+01	<0.05	3.0E+00	2.2E+02
Rh-106	3.9E-01	<0.05	3.2E-02	1.7E+00
Ru-103	1.6E-02	<0.05	8.8E-04	8.2E-02
Ru-106	4.0E-01	<0.05	3.4E-02	1.8E+00
Sb-124	2.4E-03	<0.05	1.3E-04	1.2E-02
Sb-125	4.1E+00	<0.05	3.7E-01	1.8E+01
Sc-46	3.7E-02	<0.05	2.0E-03	1.9E-01
Se-75	9.4E-03	<0.05	5.1E-04	4.8E-02
Sn-113	6.3E-02	<0.05	3.7E-03	3.1E-01
Sn-117m	3.4E-02	<0.05	2.0E-03	1.7E-01
Sr-89	5.4E-04	<0.05	2.9E-05	2.7E-03
Sr-90	8.2E+01	<0.05	1.1E+01	3.1E+02
Ta-182	7.6E+03	0.2	2.4E+03	1.8E+04

Table 3-4b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Tc-99	1.4E+00	<0.05	8.6E-02	6.7E+00
Te-132	2.9E-03	<0.05	1.6E-04	1.5E-02
U-234	5.0E-02	<0.05	3.1E-02	7.6E-02
U-235	1.7E-03	<0.05	1.3E-03	2.3E-03
U-236	6.0E-03	<0.05	2.9E-03	1.1E-02
U-238	5.2E-02	<0.05	3.2E-02	7.8E-02
Xe-133	5.0E-04	<0.05	2.7E-05	2.5E-03
Y-90	6.9E+01	<0.05	7.0E+00	2.9E+02
Zn-65	1.2E+00	<0.05	6.5E-02	6.1E+00
Zr-95	3.2E+03	0.1	1.0E+03	7.7E+03
Total	3.8E+06	100.0		

Table 3-5a. Inventory of nonradiological contaminants (listed by quantity) from Test Area North for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7439-92-1	Lead	5.4E+06	4.9E+06	6.0E+06

Table 3-5b. Inventory of nonradiological contaminants (listed alphabetically) from Test Area North for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7439-92-1	Lead	5.4E+06	4.9E+06	6.0E+06

Table 3-6a. Inventory of radiological contaminants (listed by quantity) from Test Area North for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Cs-137	1.7E+03	76.4	3.1E+02	5.5E+03
Sr-90	2.6E+02	11.8	4.5E+00	1.7E+03
Ni-63	8.1E+01	3.7	9.8E+00	3.2E+02
Co-60	6.4E+01	2.9	1.2E+01	2.1E+02
Cs-134	4.6E+01	2.1	6.5E-01	3.0E+02
Mn-54	2.5E+01	1.1	1.6E-01	1.8E+02
Fe-55	2.4E+01	1.1	2.9E+00	9.4E+01
Co-58	1.0E+01	0.5	6.3E-02	7.6E+01
Ce-144	6.5E+00	0.3	5.5E-02	4.6E+01
Sb-125	1.4E+00	0.1	1.4E-02	9.4E+00
H-3	1.2E+00	<0.05	1.2E-02	8.0E+00
U-238	9.7E-01	<0.05	9.2E-01	1.0E+00
U-234	2.7E-01	<0.05	2.6E-01	2.9E-01
Ru-106	1.9E-01	<0.05	1.6E-03	1.3E+00
Ba-140	7.6E-02	<0.05	4.0E-04	5.5E-01
Am-241	3.6E-02	<0.05	1.9E-04	2.6E-01
Cr-51	1.7E-02	<0.05	1.1E-04	1.2E-01
Ag-110m	1.6E-02	<0.05	9.3E-05	1.1E-01
U-235	1.3E-02	<0.05	1.2E-02	1.4E-02
C-14	1.2E-02	<0.05	6.5E-05	9.0E-02
Pu-239	8.1E-03	<0.05	4.8E-05	5.8E-02
I-131	7.1E-03	<0.05	7.8E-05	4.8E-02
Pu-241	6.5E-03	<0.05	3.4E-05	4.7E-02
Sr-89	3.0E-03	<0.05	1.6E-05	2.1E-02
Tc-99	2.7E-03	<0.05	1.4E-05	2.0E-02
Cm-244	1.1E-03	<0.05	6.0E-06	8.2E-03
Eu-155	1.0E-03	<0.05	5.6E-06	7.3E-03

Table 3-6a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
I-129	2.7E-04	<0.05	1.4E-06	1.9E-03
Pu-238	2.2E-04	<0.05	1.2E-06	1.6E-03
Fe-59	1.9E-04	<0.05	1.0E-06	1.4E-03
Pu-240	1.3E-04	<0.05	6.8E-07	9.3E-04
Eu-154	1.0E-05	<0.05	5.6E-08	7.6E-05
Nb-94	3.4E-06	<0.05	1.8E-08	2.5E-05
Eu-152	2.4E-06	<0.05	1.2E-08	1.7E-05
U-236	5.5E-07	<0.05	2.6E-07	1.0E-06
Np-237	6.0E-08	<0.05	3.2E-10	4.4E-07
Cm-242	4.9E-08	<0.05	2.6E-10	3.6E-07
Pu-242	1.2E-08	<0.05	6.0E-11	8.9E-08
Total	2.2E+03	100.0		

Table 3-6b. Inventory of radiological contaminants (listed alphabetically) from Test Area North for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ag-110m	1.6E-02	<0.05	9.3E-05	1.1E-01
Am-241	3.6E-02	<0.05	1.9E-04	2.6E-01
Ba-140	7.6E-02	<0.05	4.0E-04	5.5E-01
C-14	1.2E-02	<0.05	6.5E-05	9.0E-02
Ce-144	6.5E+00	0.3	5.5E-02	4.6E+01
Cm-242	4.9E-08	<0.05	2.6E-10	3.6E-07
Cm-244	1.1E-03	<0.05	6.0E-06	8.2E-03
Co-58	1.0E+01	0.5	6.3E-02	7.6E+01
Co-60	6.4E+01	2.9	1.2E+01	2.1E+02
Cr-51	1.7E-02	<0.05	1.1E-04	1.2E-01
Cs-134	4.6E+01	2.1	6.5E-01	3.0E+02
Cs-137	1.7E+03	76.4	3.1E+02	5.5E+03
Eu-152	2.4E-06	<0.05	1.2E-08	1.7E-05
Eu-154	1.0E-05	<0.05	5.6E-08	7.6E-05
Eu-155	1.0E-03	<0.05	5.6E-06	7.3E-03
Fe-55	2.4E+01	1.1	2.9E+00	9.4E+01
Fe-59	1.9E-04	<0.05	1.0E-06	1.4E-03
H-3	1.2E+00	<0.05	1.2E-02	8.0E+00
I-129	2.7E-04	<0.05	1.4E-06	1.9E-03
I-131	7.1E-03	<0.05	7.8E-05	4.8E-02
Mn-54	2.5E+01	1.1	1.6E-01	1.8E+02
Nb-94	3.4E-06	<0.05	1.8E-08	2.5E-05
Ni-63	8.1E+01	3.7	9.8E+00	3.2E+02
Np-237	6.0E-08	<0.05	3.2E-10	4.4E-07
Pu-238	2.2E-04	<0.05	1.2E-06	1.6E-03
Pu-239	8.1E-03	<0.05	4.8E-05	5.8E-02
Pu-240	1.3E-04	<0.05	6.8E-07	9.3E-04

Table 3-6b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Pu-241	6.5E-03	<0.05	3.4E-05	4.7E-02
Pu-242	1.2E-08	<0.05	6.0E-11	8.9E-08
Ru-106	1.9E-01	<0.05	1.6E-03	1.3E+00
Sb-125	1.4E+00	0.1	1.4E-02	9.4E+00
Sr-89	3.0E-03	<0.05	1.6E-05	2.1E-02
Sr-90	2.6E+02	11.8	4.5E+00	1.7E+03
Tc-99	2.7E-03	<0.05	1.4E-05	2.0E-02
U-234	2.7E-01	<0.05	2.6E-01	2.9E-01
U-235	1.3E-02	<0.05	1.2E-02	1.4E-02
U-236	5.5E-07	<0.05	2.6E-07	1.0E-06
U-238	9.7E-01	<0.05	9.2E-01	1.0E+00
Total	2.2E+03	100.0		

Table 3-7a. Inventory of radiological contaminants (listed by quantity) from the Test Area North for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Cs-137	7.2E-01	46.4	2.6E-01	1.6E+00
Sr-90	4.5E-01	29.2	2.4E-02	2.3E+00
Cs-134	3.3E-01	21.3	1.8E-02	1.7E+00
U-238	3.2E-02	2.1	1.7E-02	5.6E-02
U-234	1.3E-02	0.8	6.9E-03	2.3E-02
Co-60	1.4E-03	0.1	5.0E-04	3.2E-03
U-235	6.6E-04	<0.05	4.0E-04	1.0E-03
Total	1.5E+00	99.9		

Table 3-7b. Inventory of radiological contaminants (listed alphabetically) from the Test Area North for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Co-60	1.4E-03	0.1	5.0E-04	3.2E-03
Cs-134	3.3E-01	21.3	1.8E-02	1.7E+00
Cs-137	7.2E-01	46.4	2.6E-01	1.6E+00
Sr-90	4.5E-01	29.2	2.4E-02	2.3E+00
U-234	1.3E-02	0.8	6.9E-03	2.3E-02
U-235	6.6E-04	<0.05	4.0E-04	1.0E-03
U-238	3.2E-02	2.1	1.7E-02	5.6E-02
Total	1.5E+00	99.9		

Table 3-8a. Inventory of nonradiological contaminants (listed by quantity) from the Test Reactor Area for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-41-7	Beryllium	6.3E+06	6.3E+06	6.4E+06
7439-92-1	Lead	1.6E+06	5.4E+05	3.6E+06

Table 3-8b. Inventory of nonradiological contaminants (listed alphabetically) from the Test Reactor Area for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-41-7	Beryllium	6.3E+06	6.3E+06	6.4E+06
7439-92-1	Lead	1.6E+06	5.4E+05	3.6E+06

Table 3-9a. Inventory of nonradiological contaminants (listed by quantity) from the Test Reactor Area for the years 1994–2003.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-41-7	Beryllium	5.0E+07	5.0E+07	5.1E+07

Table 3-9b. Inventory of nonradiological contaminants (listed alphabetically) from the Test Reactor Area for the years 1994–2003.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-41-7	Beryllium	5.0E+07	5.0E+07	5.1E+07

Table 3-10a. Inventory of radiological contaminants (listed by quantity) from the Test Reactor Area for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
H-3	2.9E+05	91.2	1.0E+05	6.7E+05
Co-60	1.2E+04	3.7	3.4E+03	3.1E+04
Fe-55	6.8E+03	2.1	1.2E+03	2.2E+04
Ni-63	4.0E+03	1.2	4.2E+02	1.7E+04
Cr-51	2.5E+03	0.8	5.3E+01	1.6E+04
Zn-65	1.0E+03	0.3	8.5E+00	7.2E+03
Cs-137	8.8E+02	0.3	2.2E+02	2.5E+03
Mn-54	1.6E+02	<0.05	2.1E+00	1.1E+03
Nb-95	1.4E+02	<0.05	9.2E-01	1.0E+03
Zr-95	1.4E+02	<0.05	2.2E+00	8.9E+02
Sn-117m	1.2E+02	<0.05	6.1E-01	8.7E+02
Sn-119m	7.5E+01	<0.05	5.6E-01	5.3E+02
Ce-144	6.6E+01	<0.05	2.2E+00	3.8E+02
Cs-134	6.6E+01	<0.05	1.2E+00	4.2E+02
Co-58	5.9E+01	<0.05	1.0E+00	3.8E+02
Sb-125	5.0E+01	<0.05	6.0E-01	3.4E+02
Sc-46	5.0E+01	<0.05	2.6E-01	3.6E+02
Te-125m	4.2E+01	<0.05	2.2E-01	3.0E+02
Ni-59	3.1E+01	<0.05	1.5E-01	2.3E+02
C-14	3.0E+01	<0.05	1.7E-01	2.2E+02
Eu-155	2.6E+01	<0.05	1.5E-01	1.9E+02
Sr-90	2.6E+01	<0.05	6.7E-01	1.6E+02
Sn-113	2.2E+01	<0.05	1.6E-01	1.6E+02
Pu-241	1.7E+01	<0.05	1.0E-01	1.2E+02
Am-241	3.4E+00	<0.05	2.1E-02	2.4E+01
Sr-89	3.0E+00	<0.05	3.7E-02	2.0E+01
Ce-141	2.9E+00	<0.05	5.4E-02	1.8E+01

Table 3-10a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Hf-175	2.8E+00	<0.05	1.5E-02	2.0E+01
Na-24	2.7E+00	<0.05	2.0E-02	1.9E+01
La-140	2.5E+00	<0.05	3.2E-02	1.6E+01
Pm-147	2.4E+00	<0.05	1.2E-02	1.7E+01
Ba-140	2.1E+00	<0.05	2.7E-02	1.4E+01
Ag-110	1.9E+00	<0.05	1.0E-02	1.4E+01
Hf-181	1.7E+00	<0.05	2.4E-02	1.1E+01
Pr-144	1.4E+00	<0.05	1.3E-02	9.7E+00
Mn-56	1.3E+00	<0.05	6.6E-03	9.5E+00
Gd-153	1.3E+00	<0.05	1.1E-02	9.2E+00
I-132	1.0E+00	<0.05	5.6E-03	7.3E+00
Eu-152	9.9E-01	<0.05	5.2E-03	7.2E+00
Fe-59	8.6E-01	<0.05	5.1E-03	6.2E+00
Ir-192	6.6E-01	<0.05	5.4E-03	4.6E+00
Tc-99	5.0E-01	<0.05	2.7E-03	3.6E+00
Eu-154	4.9E-01	<0.05	1.2E-02	3.0E+00
Nb-94	2.0E-01	<0.05	8.9E-04	1.5E+00
Ru-103	1.9E-01	<0.05	2.5E-03	1.3E+00
Pu-238	1.6E-01	<0.05	9.7E-04	1.1E+00
Pu-239	1.5E-01	<0.05	8.6E-04	1.1E+00
Y-93	1.1E-01	<0.05	5.6E-04	8.0E-01
Cm-242	8.8E-02	<0.05	6.8E-04	6.2E-01
Cm-244	7.5E-02	<0.05	4.9E-04	5.4E-01
I-131	6.9E-02	<0.05	5.1E-04	4.9E-01
Se-75	4.5E-02	<0.05	8.0E-04	2.9E-01
Mo-99	2.3E-02	<0.05	1.6E-04	1.6E-01
Pu-240	1.7E-02	<0.05	1.1E-04	1.2E-01

Table 3-10a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Co-57	1.7E-02	<0.05	1.1E-04	1.2E-01
Cd-109	1.1E-02	<0.05	5.6E-05	7.9E-02
Re-188	9.3E-03	<0.05	4.7E-05	6.8E-02
U-238	7.8E-03	<0.05	6.7E-03	9.0E-03
Ta-182	7.6E-03	<0.05	5.9E-05	5.4E-02
Sb-124	6.9E-03	<0.05	5.6E-05	4.8E-02
U-235	6.1E-03	<0.05	5.1E-03	7.3E-03
U-234	6.0E-03	<0.05	3.0E-03	1.1E-02
Sr-91	4.4E-03	<0.05	2.2E-05	3.2E-02
Np-237	3.7E-03	<0.05	2.2E-05	2.7E-02
Y-88	3.0E-03	<0.05	1.5E-05	2.2E-02
U-236	2.3E-03	<0.05	1.1E-03	4.1E-03
I-129	1.8E-03	<0.05	2.1E-05	1.2E-02
Sr-92	1.6E-03	<0.05	8.2E-06	1.2E-02
I-133	1.5E-03	<0.05	7.6E-06	1.1E-02
Br-82	1.0E-03	<0.05	5.1E-06	7.3E-03
Te-132	3.0E-04	<0.05	1.5E-06	2.2E-03
Ce-139	3.0E-04	<0.05	1.5E-06	2.2E-03
Ag-108m	1.1E-07	<0.05	5.5E-10	7.7E-07
Total	3.2E+05	99.6		

Table 3-10b. Inventory of radiological contaminants (listed alphabetically) from the Test Reactor Area for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ag-108m	1.1E-07	<0.05	5.5E-10	7.7E-07
Ag-110	1.9E+00	<0.05	1.0E-02	1.4E+01
Am-241	3.4E+00	<0.05	2.1E-02	2.4E+01
Ba-140	2.1E+00	<0.05	2.7E-02	1.4E+01
Br-82	1.0E-03	<0.05	5.1E-06	7.3E-03
C-14	3.0E+01	<0.05	1.7E-01	2.2E+02
Cd-109	1.1E-02	<0.05	5.6E-05	7.9E-02
Ce-139	3.0E-04	<0.05	1.5E-06	2.2E-03
Ce-141	2.9E+00	<0.05	5.4E-02	1.8E+01
Ce-144	6.6E+01	<0.05	2.2E+00	3.8E+02
Cm-242	8.8E-02	<0.05	6.8E-04	6.2E-01
Cm-244	7.5E-02	<0.05	4.9E-04	5.4E-01
Co-57	1.7E-02	<0.05	1.1E-04	1.2E-01
Co-58	5.9E+01	<0.05	1.0E+00	3.8E+02
Co-60	1.2E+04	3.7	3.4E+03	3.1E+04
Cr-51	2.5E+03	0.8	5.3E+01	1.6E+04
Cs-134	6.6E+01	<0.05	1.2E+00	4.2E+02
Cs-137	8.8E+02	0.3	2.2E+02	2.5E+03
Eu-152	9.9E-01	<0.05	5.2E-03	7.2E+00
Eu-154	4.9E-01	<0.05	1.2E-02	3.0E+00
Eu-155	2.6E+01	<0.05	1.5E-01	1.9E+02
Fe-55	6.8E+03	2.1	1.2E+03	2.2E+04
Fe-59	8.6E-01	<0.05	5.1E-03	6.2E+00
Gd-153	1.3E+00	<0.05	1.1E-02	9.2E+00
H-3	2.9E+05	91.2	1.0E+05	6.7E+05
Hf-175	2.8E+00	<0.05	1.5E-02	2.0E+01
Hf-181	1.7E+00	<0.05	2.4E-02	1.1E+01

Table 3-10b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
I-129	1.8E-03	<0.05	2.1E-05	1.2E-02
I-131	6.9E-02	<0.05	5.1E-04	4.9E-01
I-132	1.0E+00	<0.05	5.6E-03	7.3E+00
I-133	1.5E-03	<0.05	7.6E-06	1.1E-02
Ir-192	6.6E-01	<0.05	5.4E-03	4.6E+00
La-140	2.5E+00	<0.05	3.2E-02	1.6E+01
Mn-54	1.6E+02	<0.05	2.1E+00	1.1E+03
Mn-56	1.3E+00	<0.05	6.6E-03	9.5E+00
Mo-99	2.3E-02	<0.05	1.6E-04	1.6E-01
Na-24	2.7E+00	<0.05	2.0E-02	1.9E+01
Nb-94	2.0E-01	<0.05	8.9E-04	1.5E+00
Nb-95	1.4E+02	<0.05	9.2E-01	1.0E+03
Ni-59	3.1E+01	<0.05	1.5E-01	2.3E+02
Ni-63	4.0E+03	1.2	4.2E+02	1.7E+04
Np-237	3.7E-03	<0.05	2.2E-05	2.7E-02
Pm-147	2.4E+00	<0.05	1.2E-02	1.7E+01
Pr-144	1.4E+00	<0.05	1.3E-02	9.7E+00
Pu-238	1.6E-01	<0.05	9.7E-04	1.1E+00
Pu-239	1.5E-01	<0.05	8.6E-04	1.1E+00
Pu-240	1.7E-02	<0.05	1.1E-04	1.2E-01
Pu-241	1.7E+01	<0.05	1.0E-01	1.2E+02
Re-188	9.3E-03	<0.05	4.7E-05	6.8E-02
Ru-103	1.9E-01	<0.05	2.5E-03	1.3E+00
Sb-124	6.9E-03	<0.05	5.6E-05	4.8E-02
Sb-125	5.0E+01	<0.05	6.0E-01	3.4E+02
Sc-46	5.0E+01	<0.05	2.6E-01	3.6E+02
Se-75	4.5E-02	<0.05	8.0E-04	2.9E-01

Table 3-10b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Sn-113	2.2E+01	<0.05	1.6E-01	1.6E+02
Sn-117m	1.2E+02	<0.05	6.1E-01	8.7E+02
Sn-119m	7.5E+01	<0.05	5.6E-01	5.3E+02
Sr-89	3.0E+00	<0.05	3.7E-02	2.0E+01
Sr-90	2.6E+01	<0.05	6.7E-01	1.6E+02
Sr-91	4.4E-03	<0.05	2.2E-05	3.2E-02
Sr-92	1.6E-03	<0.05	8.2E-06	1.2E-02
Ta-182	7.6E-03	<0.05	5.9E-05	5.4E-02
Tc-99	5.0E-01	<0.05	2.7E-03	3.6E+00
Te-125m	4.2E+01	<0.05	2.2E-01	3.0E+02
Te-132	3.0E-04	<0.05	1.5E-06	2.2E-03
U-234	6.0E-03	<0.05	3.0E-03	1.1E-02
U-235	6.1E-03	<0.05	5.1E-03	7.3E-03
U-236	2.3E-03	<0.05	1.1E-03	4.1E-03
U-238	7.8E-03	<0.05	6.7E-03	9.0E-03
Y-88	3.0E-03	<0.05	1.5E-05	2.2E-02
Y-93	1.1E-01	<0.05	5.6E-04	8.0E-01
Zn-65	1.0E+03	0.3	8.5E+00	7.2E+03
Zr-95	1.4E+02	<0.05	2.2E+00	8.9E+02
Total	3.2E+05	99.6		

Table 3-11a. Inventory of radiological contaminants (listed by quantity) from the Test Reactor Area for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
H-3	2.6E+06	94.0	1.3E+06	5.0E+06
Co-60	1.3E+05	4.7	9.6E+03	6.3E+05
Ni-63	2.2E+04	0.8	3.0E+03	8.0E+04
Fe-55	1.4E+04	0.5	5.0E+03	3.0E+04
Cs-137	1.4E+03	<0.05	5.2E+02	3.2E+03
Ni-59	1.9E+02	<0.05	1.9E+00	1.3E+03
C-14	8.1E+01	<0.05	4.7E+00	4.0E+02
Eu-155	6.7E+01	<0.05	3.7E+00	3.4E+02
Pu-241	4.2E+01	<0.05	2.3E+00	2.1E+02
Ce-144	3.4E+01	<0.05	1.9E+00	1.7E+02
Cr-51	2.3E+01	<0.05	1.2E+00	1.2E+02
Sr-90	6.9E+00	<0.05	4.2E-01	3.4E+01
Nb-94	1.9E+00	<0.05	1.9E-02	1.3E+01
Tc-99	1.3E+00	<0.05	7.1E-02	6.5E+00
Zn-65	1.2E+00	<0.05	6.5E-02	6.1E+00
Co-58	1.1E+00	<0.05	5.8E-02	5.4E+00
Mn-54	5.1E-01	<0.05	2.8E-02	2.6E+00
Pu-239	3.9E-01	<0.05	2.1E-02	2.0E+00
Pu-238	3.9E-01	<0.05	2.1E-02	2.0E+00
Pr-144	2.2E-01	<0.05	1.2E-02	1.1E+00
Am-241	2.0E-01	<0.05	1.1E-02	9.8E-01
Cm-242	1.9E-01	<0.05	1.1E-02	9.8E-01
Cm-244	1.8E-01	<0.05	9.9E-03	9.1E-01
Hf-181	1.6E-01	<0.05	8.8E-03	8.3E-01
Zr-95	1.4E-01	<0.05	7.5E-03	7.1E-01
Nb-95	1.4E-01	<0.05	7.4E-03	6.9E-01
Cs-134	1.3E-01	<0.05	7.0E-03	6.6E-01

Table 3-11a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ce-141	1.2E-01	<0.05	6.6E-03	6.2E-01
La-140	9.1E-02	<0.05	4.9E-03	4.6E-01
Pu-240	4.1E-02	<0.05	2.2E-03	2.1E-01
Sc-46	3.7E-02	<0.05	2.0E-03	1.9E-01
Ba-140	2.7E-02	<0.05	1.4E-03	1.4E-01
Mo-99	2.4E-02	<0.05	1.3E-03	1.2E-01
Eu-154	2.1E-02	<0.05	1.1E-03	1.0E-01
Ru-103	1.6E-02	<0.05	8.8E-04	8.2E-02
U-234	1.5E-02	<0.05	7.0E-03	2.9E-02
Fe-59	1.2E-02	<0.05	6.4E-04	6.1E-02
Se-75	9.4E-03	<0.05	5.1E-04	4.8E-02
Np-237	9.3E-03	<0.05	5.2E-04	4.7E-02
U-236	5.7E-03	<0.05	2.7E-03	1.1E-02
Xe-133	5.0E-04	<0.05	2.7E-05	2.5E-03
I-129	3.4E-04	<0.05	1.8E-05	1.7E-03
U-235	3.2E-04	<0.05	1.5E-04	6.1E-04
I-131	2.5E-04	<0.05	1.4E-05	1.3E-03
Total	2.8E+06	100.0		

Table 3-11b. Inventory of radiological contaminants (listed alphabetically) from the Test Reactor Area for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Am-241	2.0E-01	<0.05	1.1E-02	9.8E-01
Ba-140	2.7E-02	<0.05	1.4E-03	1.4E-01
C-14	8.1E+01	<0.05	4.7E+00	4.0E+02
Ce-141	1.2E-01	<0.05	6.6E-03	6.2E-01
Ce-144	3.4E+01	<0.05	1.9E+00	1.7E+02
Cm-242	1.9E-01	<0.05	1.1E-02	9.8E-01
Cm-244	1.8E-01	<0.05	9.9E-03	9.1E-01
Co-58	1.1E+00	<0.05	5.8E-02	5.4E+00
Co-60	1.3E+05	4.7	9.6E+03	6.3E+05
Cr-51	2.3E+01	<0.05	1.2E+00	1.2E+02
Cs-134	1.3E-01	<0.05	7.0E-03	6.6E-01
Cs-137	1.4E+03	<0.05	5.2E+02	3.2E+03
Eu-154	2.1E-02	<0.05	1.1E-03	1.0E-01
Eu-155	6.7E+01	<0.05	3.7E+00	3.4E+02
Fe-55	1.4E+04	0.5	5.0E+03	3.0E+04
Fe-59	1.2E-02	<0.05	6.4E-04	6.1E-02
H-3	2.6E+06	94.0	1.3E+06	5.0E+06
Hf-181	1.6E-01	<0.05	8.8E-03	8.3E-01
I-129	3.4E-04	<0.05	1.8E-05	1.7E-03
I-131	2.5E-04	<0.05	1.4E-05	1.3E-03
La-140	9.1E-02	<0.05	4.9E-03	4.6E-01
Mn-54	5.1E-01	<0.05	2.8E-02	2.6E+00
Mo-99	2.4E-02	<0.05	1.3E-03	1.2E-01
Nb-94	1.9E+00	<0.05	1.9E-02	1.3E+01
Nb-95	1.4E-01	<0.05	7.4E-03	6.9E-01
Ni-59	1.9E+02	<0.05	1.9E+00	1.3E+03
Ni-63	2.2E+04	0.8	3.0E+03	8.0E+04

Table 3-11b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Np-237	9.3E-03	<0.05	5.2E-04	4.7E-02
Pr-144	2.2E-01	<0.05	1.2E-02	1.1E+00
Pu-238	3.9E-01	<0.05	2.1E-02	2.0E+00
Pu-239	3.9E-01	<0.05	2.1E-02	2.0E+00
Pu-240	4.1E-02	<0.05	2.2E-03	2.1E-01
Pu-241	4.2E+01	<0.05	2.3E+00	2.1E+02
Ru-103	1.6E-02	<0.05	8.8E-04	8.2E-02
Sc-46	3.7E-02	<0.05	2.0E-03	1.9E-01
Se-75	9.4E-03	<0.05	5.1E-04	4.8E-02
Sr-90	6.9E+00	<0.05	4.2E-01	3.4E+01
Tc-99	1.3E+00	<0.05	7.1E-02	6.5E+00
U-234	1.5E-02	<0.05	7.0E-03	2.9E-02
U-235	3.2E-04	<0.05	1.5E-04	6.1E-04
U-236	5.7E-03	<0.05	2.7E-03	1.1E-02
Xe-133	5.0E-04	<0.05	2.7E-05	2.5E-03
Zn-65	1.2E+00	<0.05	6.5E-02	6.1E+00
Zr-95	1.4E-01	<0.05	7.5E-03	7.1E-01
Total	2.8E+06	100.0		

Table 3-12a. Inventory of nonradiological contaminants (listed by quantity) from the Idaho Chemical Processing Plant for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7439-92-1	Lead	7.8E+07	6.3E+07	9.6E+07
1332-21-4	Asbestos	1.2E+06	6.3E+05	2.2E+06

Table 3-12b. Inventory of nonradiological contaminants (listed alphabetically) from the Idaho Chemical Processing Plant for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
1332-21-4	Asbestos	1.2E+06	6.3E+05	2.2E+06
7439-92-1	Lead	7.8E+07	6.3E+07	9.6E+07

Table 3-13a. Inventory of radiological contaminants (listed by quantity) from the Idaho Chemical Processing Plant for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ce-144	1.2E+02	18.0	2.3E+01	3.9E+02
Pr-144	1.1E+02	16.4	1.9E+01	3.7E+02
Cs-137	9.9E+01	14.7	6.0E+01	1.5E+02
Sr-90	8.7E+01	12.9	1.1E+01	3.3E+02
Y-90	6.2E+01	9.2	1.1E+01	2.0E+02
Ru-106	6.1E+01	9.1	1.1E+01	2.0E+02
Rh-106	6.1E+01	9.1	1.1E+01	2.0E+02
Sb-125	2.8E+01	4.2	5.0E+00	9.2E+01
Zr-95	1.9E+01	2.8	3.5E+00	6.1E+01
Nb-95	1.9E+01	2.8	3.5E+00	6.1E+01
Eu-152	3.1E+00	0.5	1.6E-01	1.6E+01
Eu-154	2.2E+00	0.3	1.1E-01	1.1E+01
Eu-155	4.5E-01	0.1	2.3E-02	2.3E+00
Co-60	1.0E-01	<0.05	4.7E-02	1.9E-01
Cs-134	5.0E-02	<0.05	2.6E-03	2.6E-01
Total	6.7E+02	100.1		

Table 3-13b. Inventory of radiological contaminants (listed alphabetically) from the Idaho Chemical Processing Plant for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ce-144	1.2E+02	18.0	2.3E+01	3.9E+02
Co-60	1.0E-01	<0.05	4.7E-02	1.9E-01
Cs-134	5.0E-02	<0.05	2.6E-03	2.6E-01
Cs-137	9.9E+01	14.7	6.0E+01	1.5E+02
Eu-152	3.1E+00	0.5	1.6E-01	1.6E+01
Eu-154	2.2E+00	0.3	1.1E-01	1.1E+01
Eu-155	4.5E-01	0.1	2.3E-02	2.3E+00
Nb-95	1.9E+01	2.8	3.5E+00	6.1E+01
Pr-144	1.1E+02	16.4	1.9E+01	3.7E+02
Rh-106	6.1E+01	9.1	1.1E+01	2.0E+02
Ru-106	6.1E+01	9.1	1.1E+01	2.0E+02
Sb-125	2.8E+01	4.2	5.0E+00	9.2E+01
Sr-90	8.7E+01	12.9	1.1E+01	3.3E+02
Y-90	6.2E+01	9.2	1.1E+01	2.0E+02
Zr-95	1.9E+01	2.8	3.5E+00	6.1E+01
Total	6.7E+02	100.1		

Table 3-14a. Inventory of radiological contaminants (listed by quantity) from the Idaho Chemical Processing Plant for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Cs-137	5.2E+01	33.0	1.8E+01	1.2E+02
Y-90	4.9E+01	31.0	2.6E+00	2.5E+02
Sr-90	4.9E+01	31.0	2.6E+00	2.5E+02
Cs-134	2.2E+00	1.4	1.2E-01	1.1E+01
Pr-144	1.9E+00	1.2	1.0E-01	9.6E+00
Ce-144	1.9E+00	1.2	1.0E-01	9.6E+00
Eu-154	4.8E-01	0.3	2.6E-02	2.4E+00
Sb-125	4.0E-01	0.2	2.2E-02	2.0E+00
Ru-106	3.1E-01	0.2	1.7E-02	1.6E+00
Rh-106	3.1E-01	0.2	1.7E-02	1.6E+00
Eu-155	3.1E-01	0.2	1.7E-02	1.6E+00
H-3	6.2E-02	<0.05	3.4E-03	3.2E-01
Co-60	3.1E-02	<0.05	1.1E-02	7.1E-02
I-129	1.0E-02	<0.05	5.4E-04	5.1E-02
Total	1.6E+02	99.9		

Table 3-14b. Inventory of radiological contaminants (listed alphabetically) from the Idaho Chemical Processing Plant for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ce-144	1.9E+00	1.2	1.0E-01	9.6E+00
Co-60	3.1E-02	<0.05	1.1E-02	7.1E-02
Cs-134	2.2E+00	1.4	1.2E-01	1.1E+01
Cs-137	5.2E+01	33.0	1.8E+01	1.2E+02
Eu-154	4.8E-01	0.3	2.6E-02	2.4E+00
Eu-155	3.1E-01	0.2	1.7E-02	1.6E+00
H-3	6.2E-02	<0.05	3.4E-03	3.2E-01
I-129	1.0E-02	<0.05	5.4E-04	5.1E-02
Pr-144	1.9E+00	1.2	1.0E-01	9.6E+00
Rh-106	3.1E-01	0.2	1.7E-02	1.6E+00
Ru-106	3.1E-01	0.2	1.7E-02	1.6E+00
Sb-125	4.0E-01	0.2	2.2E-02	2.0E+00
Sr-90	4.9E+01	31.0	2.6E+00	2.5E+02
Y-90	4.9E+01	31.0	2.6E+00	2.5E+02
Total	1.6E+02	99.9		

Table 3-15a. Inventory of nonradiological contaminants (listed by quantity) from the Naval Reactors Facility for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7439-92-1	Lead	6.4E+05	6.1E+05	6.8E+05
1332-21-4	Asbestos	5.8E+05	4.9E+05	6.7E+05

Table 3-15b. Inventory of nonradiological contaminants (listed alphabetically) from the Naval Reactors Facility for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
1332-21-4	Asbestos	5.8E+05	4.9E+05	6.7E+05
7439-92-1	Lead	6.4E+05	6.1E+05	6.8E+05

Table 3-16a. Inventory of radiological contaminants (listed by quantity) from the Naval Reactors Facility for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ni-63	4.7E+05	48.5	4.3E+05	5.2E+05
Co-60	2.8E+05	28.8	2.5E+05	3.1E+05
Fe-55	1.5E+05	15.5	1.4E+05	1.7E+05
Co-58	2.1E+04	2.1	1.8E+04	2.3E+04
Ta-182	1.8E+04	1.8	1.6E+04	2.0E+04
Sn-119m	8.8E+03	0.9	7.6E+03	1.0E+04
W-185	6.4E+03	0.6	5.6E+03	7.3E+03
Nb-95	3.6E+03	0.4	3.2E+03	4.1E+03
Hf-181	3.4E+03	0.4	3.0E+03	3.9E+03
Hf-175	2.8E+03	0.3	2.5E+03	3.2E+03
Sb-125	2.8E+03	0.3	2.5E+03	3.2E+03
Zr-95	1.9E+03	0.2	1.7E+03	2.2E+03
Ni-59	1.4E+03	0.1	1.2E+03	1.5E+03
Mn-54	3.0E+02	<0.05	2.6E+02	3.4E+02
Cr-51	2.7E+02	<0.05	2.3E+02	3.0E+02
H-3	1.8E+01	<0.05	1.6E+01	2.0E+01
C-14	1.0E+01	<0.05	8.7E+00	1.1E+01
Cs-137	6.0E+00	<0.05	5.1E+00	7.0E+00
Ba-137m	4.6E+00	<0.05	3.0E+00	6.8E+00
Sn-113	2.0E+00	<0.05	1.7E+00	2.3E+00
Total	9.7E+05	99.9		

Table 3-16b. Inventory of radiological contaminants (listed alphabetically) from the Naval Reactors Facility for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ba-137m	4.6E+00	<0.05	3.0E+00	6.8E+00
C-14	1.0E+01	<0.05	8.7E+00	1.1E+01
Co-58	2.1E+04	2.1	1.8E+04	2.3E+04
Co-60	2.8E+05	28.8	2.5E+05	3.1E+05
Cr-51	2.7E+02	<0.05	2.3E+02	3.0E+02
Cs-137	6.0E+00	<0.05	5.1E+00	7.0E+00
Fe-55	1.5E+05	15.5	1.4E+05	1.7E+05
H-3	1.8E+01	<0.05	1.6E+01	2.0E+01
Hf-175	2.8E+03	0.3	2.5E+03	3.2E+03
Hf-181	3.4E+03	0.4	3.0E+03	3.9E+03
Mn-54	3.0E+02	<0.05	2.6E+02	3.4E+02
Nb-95	3.6E+03	0.4	3.2E+03	4.1E+03
Ni-59	1.4E+03	0.1	1.2E+03	1.5E+03
Ni-63	4.7E+05	48.5	4.3E+05	5.2E+05
Sb-125	2.8E+03	0.3	2.5E+03	3.2E+03
Sn-113	2.0E+00	<0.05	1.7E+00	2.3E+00
Sn-119m	8.8E+03	0.9	7.6E+03	1.0E+04
Ta-182	1.8E+04	1.8	1.6E+04	2.0E+04
W-185	6.4E+03	0.6	5.6E+03	7.3E+03
Zr-95	1.9E+03	0.2	1.7E+03	2.2E+03
Total	9.7E+05	99.9		

Table 3-17a. Inventory of radiological contaminants (listed by quantity) from the Naval Reactors Facility for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ni-63	4.7E+04	34.2	1.5E+04	1.1E+05
Co-60	4.2E+04	31.0	1.4E+04	1.0E+05
Fe-55	2.5E+04	18.2	8.0E+03	6.0E+04
Ta-182	7.6E+03	5.6	2.4E+03	1.8E+04
Nb-95	6.8E+03	5.0	2.2E+03	1.6E+04
Co-58	3.5E+03	2.5	1.1E+03	8.4E+03
Zr-95	3.2E+03	2.3	1.0E+03	7.7E+03
Cr-51	1.7E+03	1.2	5.3E+02	4.0E+03
C-14	9.8E+00	<0.05	3.1E+00	2.4E+01
H-3	2.8E+00	<0.05	8.8E-01	6.6E+00
Sr-90	1.5E-01	<0.05	4.8E-02	3.6E-01
Cs-137	5.0E-02	<0.05	1.8E-02	1.1E-01
Ba-137m	5.0E-02	<0.05	2.7E-03	2.5E-01
Mn-54	3.8E-02	<0.05	3.6E-03	1.6E-01
Tc-99	2.8E-03	<0.05	9.4E-04	6.4E-03
I-129	2.2E-06	<0.05	3.3E-07	8.0E-06
Total	1.4E+05	100.0		

Table 3-17b. Inventory of radiological contaminants (listed alphabetically) from the Naval Reactors Facility for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ba-137m	5.0E-02	<0.05	2.7E-03	2.5E-01
C-14	9.8E+00	<0.05	3.1E+00	2.4E+01
Co-58	3.5E+03	2.5	1.1E+03	8.4E+03
Co-60	4.2E+04	31.0	1.4E+04	1.0E+05
Cr-51	1.7E+03	1.2	5.3E+02	4.0E+03
Cs-137	5.0E-02	<0.05	1.8E-02	1.1E-01
Fe-55	2.5E+04	18.2	8.0E+03	6.0E+04
H-3	2.8E+00	<0.05	8.8E-01	6.6E+00
I-129	2.2E-06	<0.05	3.3E-07	8.0E-06
Mn-54	3.8E-02	<0.05	3.6E-03	1.6E-01
Nb-95	6.8E+03	5.0	2.2E+03	1.6E+04
Ni-63	4.7E+04	34.2	1.5E+04	1.1E+05
Sr-90	1.5E-01	<0.05	4.8E-02	3.6E-01
Ta-182	7.6E+03	5.6	2.4E+03	1.8E+04
Tc-99	2.8E-03	<0.05	9.4E-04	6.4E-03
Zr-95	3.2E+03	2.3	1.0E+03	7.7E+03
Total	1.4E+05	100.0		

Table 3-18a. Inventory of nonradiological contaminants (listed by quantity) from Argonne National Laboratory—West for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7439-92-1	Lead	9.5E+06	9.1E+06	9.8E+06
1332-21-4	Asbestos	4.1E+05	3.6E+05	4.7E+05
1314-23-4	Zirconium oxide	4.5E+03	3.9E+03	5.3E+03
7440-43-9	Cadmium	1.7E+00	1.5E+00	2.0E+00
7440-47-3	Chromium	8.2E-02	7.0E-02	9.6E-02
7439-97-6	Mercury	9.0E-03	7.7E-03	1.0E-02

Table 3-18b. Inventory of nonradiological contaminants (listed alphabetically) from Argonne National Laboratory—West for the years 1984–1993.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
1332-21-4	Asbestos	4.1E+05	3.6E+05	4.7E+05
7440-43-9	Cadmium	1.7E+00	1.5E+00	2.0E+00
7440-47-3	Chromium	8.2E-02	7.0E-02	9.6E-02
7439-92-1	Lead	9.5E+06	9.1E+06	9.8E+06
7439-97-6	Mercury	9.0E-03	7.7E-03	1.0E-02
1314-23-4	Zirconium oxide	4.5E+03	3.9E+03	5.3E+03

Table 3-19a. Inventory of nonradiological contaminants (listed by quantity) from Argonne National Laboratory—West for the years 1994–2003.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
1332-21-4	Asbestos	1.0E+05	9.6E+04	1.2E+05
7440-47-3	Chromium	1.9E+01	1.1E+01	3.0E+01
7440-39-3	Barium	7.3E+00	4.3E+00	1.2E+01
7440-43-9	Cadmium	5.8E+00	3.8E+00	8.6E+00
7439-92-1	Lead	1.6E+00	1.3E+00	2.0E+00
7440-38-2	Arsenic	2.1E-01	1.2E-01	3.3E-01
7439-97-6	Mercury	1.3E-02	1.1E-02	1.5E-02

Table 3-19b. Inventory of nonradiological contaminants (listed alphabetically) from Argonne National Laboratory—West for the years 1994–2003.

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-38-2	Arsenic	2.1E-01	1.2E-01	3.3E-01
1332-21-4	Asbestos	1.0E+05	9.6E+04	1.2E+05
7440-39-3	Barium	7.3E+00	4.3E+00	1.2E+01
7440-43-9	Cadmium	5.8E+00	3.8E+00	8.6E+00
7440-47-3	Chromium	1.9E+01	1.1E+01	3.0E+01
7439-92-1	Lead	1.6E+00	1.3E+00	2.0E+00
7439-97-6	Mercury	1.3E-02	1.1E-02	1.5E-02

Table 3-20a. Inventory of radiological contaminants (listed by quantity) from Argonne National Laboratory—West for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Co-60	1.1E+06	76.0	6.6E+05	1.8E+06
Co-58	1.8E+05	12.0	1.8E+04	7.2E+05
Mn-54	1.2E+05	8.0	1.2E+04	4.8E+05
Cr-51	4.4E+04	3.0	4.6E+03	1.8E+05
Fe-59	1.5E+04	1.0	1.5E+03	6.0E+04
Sr-90	1.6E+02	<0.05	1.9E+01	6.1E+02
Cs-137	1.5E+02	<0.05	8.8E+01	2.3E+02
Y-90	1.4E+02	<0.05	1.4E+01	5.8E+02
H-3	8.2E+01	<0.05	4.7E+00	4.1E+02
Ce-144	1.6E+01	<0.05	1.6E+00	6.6E+01
Eu-155	1.3E+01	<0.05	1.3E+00	5.2E+01
Cs-134	6.6E+00	<0.05	7.0E-01	2.7E+01
Ru-106	3.3E+00	<0.05	1.8E-01	1.7E+01
U-234	2.5E+00	<0.05	2.4E+00	2.7E+00
Pu-239	1.6E+00	<0.05	8.7E-02	7.9E+00
Co-57	1.5E+00	<0.05	8.3E-02	7.8E+00
Sb-125	9.5E-01	<0.05	1.0E-01	3.9E+00
Ta-182	6.2E-01	<0.05	3.4E-02	3.2E+00
Eu-154	5.8E-01	<0.05	8.6E-02	2.1E+00
U-238	5.3E-01	<0.05	5.0E-01	5.6E-01
Na-22	5.3E-01	<0.05	3.5E-02	2.5E+00
Zr-95	5.2E-01	<0.05	3.0E-02	2.6E+00
Nb-95	2.1E-01	<0.05	1.8E-02	9.0E-01
La-140	1.4E-01	<0.05	7.5E-03	7.1E-01
U-235	1.1E-01	<0.05	1.0E-01	1.1E-01
Sn-113	9.6E-02	<0.05	5.2E-03	4.9E-01
In-113m	8.2E-02	<0.05	4.4E-03	4.2E-01

Table 3-20a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Sn-117m	5.2E-02	<0.05	2.8E-03	2.6E-01
I-131	3.8E-02	<0.05	2.0E-03	1.9E-01
Au-198	2.4E-02	<0.05	1.3E-03	1.2E-01
Te-132	5.3E-03	<0.05	2.9E-04	2.7E-02
Sb-124	4.5E-03	<0.05	2.4E-04	2.3E-02
Ba-140	1.8E-03	<0.05	9.6E-05	9.0E-03
Ag-110m	1.8E-03	<0.05	9.6E-05	9.0E-03
Sr-89	9.9E-04	<0.05	5.4E-05	5.0E-03
Pu-240	<u>6.7E-05</u>	<u><0.05</u>	3.6E-06	3.4E-04
Total	1.5E+06	100.0		

Table 3-20b. Inventory of radiological contaminants (listed alphabetically) from Argonne National Laboratory—West for the years 1984–1993 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ag-110m	1.8E-03	<0.05	9.6E-05	9.0E-03
Au-198	2.4E-02	<0.05	1.3E-03	1.2E-01
Ba-140	1.8E-03	<0.05	9.6E-05	9.0E-03
Ce-144	1.6E+01	<0.05	1.6E+00	6.6E+01
Co-57	1.5E+00	<0.05	8.3E-02	7.8E+00
Co-58	1.8E+05	12.0	1.8E+04	7.2E+05
Co-60	1.1E+06	76.0	6.6E+05	1.8E+06
Cr-51	4.4E+04	3.0	4.6E+03	1.8E+05
Cs-134	6.6E+00	<0.05	7.0E-01	2.7E+01
Cs-137	1.5E+02	<0.05	8.8E+01	2.3E+02
Eu-154	5.8E-01	<0.05	8.6E-02	2.1E+00
Eu-155	1.3E+01	<0.05	1.3E+00	5.2E+01
Fe-59	1.5E+04	1.0	1.5E+03	6.0E+04
H-3	8.2E+01	<0.05	4.7E+00	4.1E+02
I-131	3.8E-02	<0.05	2.0E-03	1.9E-01
In-113m	8.2E-02	<0.05	4.4E-03	4.2E-01
La-140	1.4E-01	<0.05	7.5E-03	7.1E-01
Mn-54	1.2E+05	8.0	1.2E+04	4.8E+05
Na-22	5.3E-01	<0.05	3.5E-02	2.5E+00
Nb-95	2.1E-01	<0.05	1.8E-02	9.0E-01
Pu-239	1.6E+00	<0.05	8.7E-02	7.9E+00
Pu-240	6.7E-05	<0.05	3.6E-06	3.4E-04
Ru-106	3.3E+00	<0.05	1.8E-01	1.7E+01
Sb-124	4.5E-03	<0.05	2.4E-04	2.3E-02
Sb-125	9.5E-01	<0.05	1.0E-01	3.9E+00
Sn-113	9.6E-02	<0.05	5.2E-03	4.9E-01
Sn-117m	5.2E-02	<0.05	2.8E-03	2.6E-01

Table 3-20b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Sr-89	9.9E-04	<0.05	5.4E-05	5.0E-03
Sr-90	1.6E+02	<0.05	1.9E+01	6.1E+02
Ta-182	6.2E-01	<0.05	3.4E-02	3.2E+00
Te-132	5.3E-03	<0.05	2.9E-04	2.7E-02
U-234	2.5E+00	<0.05	2.4E+00	2.7E+00
U-235	1.1E-01	<0.05	1.0E-01	1.1E-01
U-238	5.3E-01	<0.05	5.0E-01	5.6E-01
Y-90	1.4E+02	<0.05	1.4E+01	5.8E+02
Zr-95	5.2E-01	<0.05	3.0E-02	2.6E+00
Total	1.5E+06	100.0		

Table 3-21a. Inventory of radiological contaminants (listed by quantity) from Argonne National Laboratory—West for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Co-60	6.2E+05	76.0	2.2E+05	1.4E+06
Co-58	9.7E+04	12.0	5.3E+03	4.9E+05
Mn-54	6.5E+04	8.0	3.5E+03	3.3E+05
Cr-51	2.4E+04	3.0	1.3E+03	1.2E+05
Fe-59	8.1E+03	1.0	4.4E+02	4.1E+04
Cs-137	1.1E+01	<0.05	3.7E+00	2.4E+01
Sr-90	9.5E+00	<0.05	5.4E-01	4.7E+01
Y-90	8.8E+00	<0.05	5.8E-01	4.2E+01
H-3	4.0E+00	<0.05	5.5E-02	2.6E+01
Ce-144	1.3E+00	<0.05	6.6E-02	6.7E+00
Eu-155	6.7E-01	<0.05	1.4E-02	4.2E+00
Cs-134	4.2E-01	<0.05	1.3E-02	2.4E+00
Zr-95	1.6E-01	<0.05	3.0E-03	1.0E+00
Co-57	1.2E-01	<0.05	4.5E-03	6.8E-01
Na-22	1.1E-01	<0.05	6.1E-03	5.5E-01
Ta-182	9.9E-02	<0.05	7.0E-03	4.6E-01
Sn-113	6.3E-02	<0.05	3.7E-03	3.1E-01
In-113m	5.4E-02	<0.05	3.1E-03	2.7E-01
Sb-125	5.3E-02	<0.05	2.2E-03	2.9E-01
Eu-154	3.6E-02	<0.05	1.7E-03	1.9E-01
Sn-117m	3.4E-02	<0.05	2.0E-03	1.7E-01
Nb-95	2.8E-02	<0.05	2.4E-03	1.2E-01
I-131	2.5E-02	<0.05	1.4E-03	1.2E-01
La-140	1.9E-02	<0.05	1.3E-04	1.4E-01
Au-198	1.6E-02	<0.05	9.0E-04	8.0E-02
Ba-140	1.5E-02	<0.05	9.6E-05	1.1E-01
Ce-141	1.3E-02	<0.05	7.2E-05	9.4E-02

Table 3-21a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ru-106	9.5E-03	<0.05	6.2E-05	6.8E-02
Pu-239	7.9E-03	<0.05	1.4E-04	5.0E-02
Np-237	7.2E-03	<0.05	3.6E-05	5.2E-02
Te-132	2.9E-03	<0.05	1.6E-04	1.5E-02
U-238	2.8E-03	<0.05	1.4E-03	5.0E-03
Sb-124	2.4E-03	<0.05	1.3E-04	1.2E-02
I-129	1.5E-03	<0.05	7.5E-06	1.1E-02
Ag-110m	9.7E-04	<0.05	5.2E-05	4.9E-03
U-234	9.4E-04	<0.05	1.1E-04	3.8E-03
U-235	7.3E-04	<0.05	4.4E-04	1.1E-03
Sr-89	5.4E-04	<0.05	2.9E-05	2.7E-03
Pu-240	1.8E-05	<0.05	1.0E-06	9.4E-05
Am-241	1.1E-05	<0.05	5.5E-08	7.9E-05
Pu-238	2.5E-06	<0.05	1.3E-08	1.8E-05
Total	8.1E+05	100.0		

Table 3-21b. Inventory of radiological contaminants (listed alphabetically) from Argonne National Laboratory—West for the years 1994–2003 (activity at time of disposal).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ag-110m	9.7E-04	<0.05	5.2E-05	4.9E-03
Am-241	1.1E-05	<0.05	5.5E-08	7.9E-05
Au-198	1.6E-02	<0.05	9.0E-04	8.0E-02
Ba-140	1.5E-02	<0.05	9.6E-05	1.1E-01
Ce-141	1.3E-02	<0.05	7.2E-05	9.4E-02
Ce-144	1.3E+00	<0.05	6.6E-02	6.7E+00
Co-57	1.2E-01	<0.05	4.5E-03	6.8E-01
Co-58	9.7E+04	12.0	5.3E+03	4.9E+05
Co-60	6.2E+05	76.0	2.2E+05	1.4E+06
Cr-51	2.4E+04	3.0	1.3E+03	1.2E+05
Cs-134	4.2E-01	<0.05	1.3E-02	2.4E+00
Cs-137	1.1E+01	<0.05	3.7E+00	2.4E+01
Eu-154	3.6E-02	<0.05	1.7E-03	1.9E-01
Eu-155	6.7E-01	<0.05	1.4E-02	4.2E+00
Fe-59	8.1E+03	1.0	4.4E+02	4.1E+04
H-3	4.0E+00	<0.05	5.5E-02	2.6E+01
I-129	1.5E-03	<0.05	7.5E-06	1.1E-02
I-131	2.5E-02	<0.05	1.4E-03	1.2E-01
In-113m	5.4E-02	<0.05	3.1E-03	2.7E-01
La-140	1.9E-02	<0.05	1.3E-04	1.4E-01
Mn-54	6.5E+04	8.0	3.5E+03	3.3E+05
Na-22	1.1E-01	<0.05	6.1E-03	5.5E-01
Nb-95	2.8E-02	<0.05	2.4E-03	1.2E-01
Np-237	7.2E-03	<0.05	3.6E-05	5.2E-02
Pu-238	2.5E-06	<0.05	1.3E-08	1.8E-05
Pu-239	7.9E-03	<0.05	1.4E-04	5.0E-02
Pu-240	1.8E-05	<0.05	1.0E-06	9.4E-05

Table 3-21b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ru-106	9.5E-03	<0.05	6.2E-05	6.8E-02
Sb-124	2.4E-03	<0.05	1.3E-04	1.2E-02
Sb-125	5.3E-02	<0.05	2.2E-03	2.9E-01
Sn-113	6.3E-02	<0.05	3.7E-03	3.1E-01
Sn-117m	3.4E-02	<0.05	2.0E-03	1.7E-01
Sr-89	5.4E-04	<0.05	2.9E-05	2.7E-03
Sr-90	9.5E+00	<0.05	5.4E-01	4.7E+01
Ta-182	9.9E-02	<0.05	7.0E-03	4.6E-01
Te-132	2.9E-03	<0.05	1.6E-04	1.5E-02
U-234	9.4E-04	<0.05	1.1E-04	3.8E-03
U-235	7.3E-04	<0.05	4.4E-04	1.1E-03
U-238	2.8E-03	<0.05	1.4E-03	5.0E-03
Y-90	8.8E+00	<0.05	5.8E-01	4.2E+01
Zr-95	1.6E-01	<0.05	3.0E-03	1.0E+00
Total	8.1E+05	100.0		

Table 3-22a. Inventory of nonradiological contaminants (listed by quantity) from other generators for the years 1984–1993.^a

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7439-92-1	Lead	2.5E+06	2.2E+06	2.8E+06
1332-21-4	Asbestos	7.5E+04	5.4E+04	1.0E+05
7440-50-8	Copper	2.3E+04	7.9E+03	5.2E+04
7440-47-3	Chromium	2.9E+01	1.7E+01	4.6E+01
7439-97-6	Mercury	2.0E+00	1.2E+00	3.2E+00
7440-38-2	Arsenic	5.0E-01	3.0E-01	7.9E-01
7440-43-9	Cadmium	3.0E-02	1.8E-02	4.8E-02

a. "Other" generators include ALE, ARA, CEG, CFA, D&D, ERP, PBF, WER, and WMC; however, only D&D and PBF contributed to this waste for 1984–1993.

Table 3-22b. Inventory of nonradiological contaminants (listed alphabetically) from other generators for the years 1984–1993.^a

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
7440-38-2	Arsenic	5.0E-01	3.0E-01	7.9E-01
1332-21-4	Asbestos	7.5E+04	5.4E+04	1.0E+05
7440-43-9	Cadmium	3.0E-02	1.8E-02	4.8E-02
7440-47-3	Chromium	2.9E+01	1.7E+01	4.6E+01
7440-50-8	Copper	2.3E+04	7.9E+03	5.2E+04
7439-92-1	Lead	2.5E+06	2.2E+06	2.8E+06
7439-97-6	Mercury	2.0E+00	1.2E+00	3.2E+00

a. "Other" generators include ALE, ARA, CEG, CFA, D&D, ERP, PBF, WER, and WMC; however, only D&D and PBF contributed to this waste for 1984–1993.

Table 3-23a. Inventory of nonradiological contaminants (listed by quantity) from other generators for the years 1994–2003.^a

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
1332-21-4	Asbestos	1.0E+06	3.5E+05	2.3E+06

a. "Other" generators include ALE, ARA, CEG, CFA, D&D, ERP, PBF, WER, and WMC; however, only ARA is expected to contribute to this waste in 1994–2003.

Table 3-23b. Inventory of nonradiological contaminants (listed alphabetically) from other generators for the years 1994–2003.^a

CAS number	Chemical	Best estimate (g)	Lower bound	Upper bound
1332-21-4	Asbestos	1.0E+06	3.5E+05	2.3E+06

a. "Other" generators include ALE, ARA, CEG, CFA, D&D, ERP, PBF, WER, and WMC; however, only ARA is expected to contribute to this waste in 1994–2003.

Table 3-24a. Inventory of radiological contaminants (listed by quantity) from other generators for the years 1984–1993 (activity at time of disposal).^a

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
H-3	2.8E+03	88.3	2.1E+03	3.7E+03
Cs-137	2.7E+02	8.3	6.9E+01	7.4E+02
Sr-90	4.9E+01	1.5	3.3E-01	3.5E+02
Cs-134	2.5E+01	0.8	1.4E-01	1.8E+02
Co-60	1.8E+01	0.6	8.5E+00	3.6E+01
Th-228	1.0E+01	0.3	8.4E+00	1.2E+01
U-232	2.2E+00	0.1	1.8E+00	2.7E+00
Ra-226	1.1E+00	<0.05	8.7E-01	1.4E+00
U-234	7.1E-01	<0.05	5.6E-01	8.8E-01
Pu-239	6.7E-01	<0.05	3.7E-02	3.4E+00
Am-241	2.8E-01	<0.05	1.6E-02	1.4E+00
Nb-95	2.7E-01	<0.05	6.0E-03	1.7E+00
La-140	2.5E-01	<0.05	1.3E-03	1.8E+00
Ba-140	2.5E-01	<0.05	1.3E-03	1.8E+00
V-48	2.0E-01	<0.05	4.4E-03	1.2E+00
Pu-238	2.0E-01	<0.05	5.1E-03	1.2E+00
Ce-144	2.0E-01	<0.05	4.3E-03	1.2E+00
Fe-59	1.8E-01	<0.05	5.5E-03	1.1E+00
Zr-95	1.4E-01	<0.05	3.1E-03	8.7E-01
Eu-154	1.3E-01	<0.05	3.6E-03	7.7E-01
U-238	1.1E-01	<0.05	9.4E-02	1.3E-01
Eu-152	5.0E-02	<0.05	1.4E-03	3.0E-01
Pu-240	4.0E-02	<0.05	1.8E-03	2.1E-01
U-235	3.0E-02	<0.05	2.4E-02	3.7E-02
Pu-241	2.0E-02	<0.05	5.1E-04	1.2E-01

Table 3-24a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
C-14	1.3E-02	<0.05	5.3E-04	7.2E-02
Na-22	5.0E-03	<0.05	1.1E-04	3.1E-02
Mn-54	5.0E-03	<0.05	1.1E-04	3.1E-02
Total	3.2E+03	99.9		

a. "Other" generators include ALE, ARA, CEG, CFA, D&D, ERP, PBF, WER, and WMC; however, ERP did not contribute to the activity for 1984–1993.

Table 3-24b. Inventory of radiological contaminants (listed alphabetically) from other generators for the years 1984–1993 (activity at time of disposal).^a

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Am-241	2.8E-01	<0.05	1.6E-02	1.4E+00
Ba-140	2.5E-01	<0.05	1.3E-03	1.8E+00
C-14	1.3E-02	<0.05	5.3E-04	7.2E-02
Ce-144	2.0E-01	<0.05	4.3E-03	1.2E+00
Co-60	1.8E+01	0.6	8.5E+00	3.6E+01
Cs-134	2.5E+01	0.8	1.4E-01	1.8E+02
Cs-137	2.7E+02	8.3	6.9E+01	7.4E+02
Eu-152	5.0E-02	<0.05	1.4E-03	3.0E-01
Eu-154	1.3E-01	<0.05	3.6E-03	7.7E-01
Fe-59	1.8E-01	<0.05	5.5E-03	1.1E+00
H-3	2.8E+03	88.3	2.1E+03	3.7E+03
La-140	2.5E-01	<0.05	1.3E-03	1.8E+00
Mn-54	5.0E-03	<0.05	1.1E-04	3.1E-02
Na-22	5.0E-03	<0.05	1.1E-04	3.1E-02
Nb-95	2.7E-01	<0.05	6.0E-03	1.7E+00
Pu-238	2.0E-01	<0.05	5.1E-03	1.2E+00
Pu-239	6.7E-01	<0.05	3.7E-02	3.4E+00
Pu-240	4.0E-02	<0.05	1.8E-03	2.1E-01
Pu-241	2.0E-02	<0.05	5.1E-04	1.2E-01
Ra-226	1.1E+00	<0.05	8.7E-01	1.4E+00
Sr-90	4.9E+01	1.5	3.3E-01	3.5E+02
Th-228	1.0E+01	0.3	8.4E+00	1.2E+01
U-232	2.2E+00	0.1	1.8E+00	2.7E+00
U-234	7.1E-01	<0.05	5.6E-01	8.8E-01
U-235	3.0E-02	<0.05	2.4E-02	3.7E-02

Table 3-24b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
U-238	1.1E-01	<0.05	9.4E-02	1.3E-01
V-48	2.0E-01	<0.05	4.4E-03	1.2E+00
Zr-95	1.4E-01	<0.05	3.1E-03	8.7E-01
Total	3.2E+03	99.9		

a. "Other" generators include ALE, ARA, CEG, CFA, D&D, ERP, PBF, WER, and WMC; however, ERP did not contribute to the activity for 1984-1993.

Table 3-25a. Inventory of radiological contaminants (listed by quantity) from other generators for the years 1994–2003 (activity at time of disposal).^a

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Co-60	1.9E+02	37.6	8.3E+01	3.8E+02
Ni-63	1.3E+02	26.2	5.5E+01	2.8E+02
Cs-137	8.8E+01	17.3	4.5E+01	1.6E+02
H-3	2.3E+01	4.6	1.8E+00	1.1E+02
Ce-144	2.1E+01	4.2	1.6E+00	9.9E+01
Sr-90	1.6E+01	3.2	2.5E+00	5.8E+01
Y-90	1.1E+01	2.2	1.5E+00	4.3E+01
Pu-241	3.9E+00	0.8	2.7E-01	1.8E+01
C-14	3.9E+00	0.8	2.7E-01	1.8E+01
Sb-125	3.6E+00	0.7	2.7E-01	1.7E+01
Eu-155	3.2E+00	0.6	2.5E-01	1.5E+01
Cs-134	1.9E+00	0.4	2.1E-01	7.5E+00
Fe-55	1.6E+00	0.3	7.3E-01	3.0E+00
Ir-192	1.4E+00	0.3	1.4E-01	5.7E+00
Ba-137m	1.1E+00	0.2	5.4E-03	7.7E+00
Eu-154	8.5E-01	0.2	5.1E-02	4.2E+00
Co-58	7.1E-01	0.1	4.2E-02	3.5E+00
Eu-152	6.9E-01	0.1	3.8E-02	3.5E+00
Pr-144	5.0E-01	0.1	6.7E-02	1.9E+00
Mn-54	4.5E-01	0.1	2.8E-02	2.2E+00
Ag-108	1.6E-01	<0.05	5.2E-03	9.4E-01
Ni-59	1.5E-01	<0.05	1.1E-02	7.1E-01
Tc-99	8.3E-02	<0.05	5.9E-03	3.9E-01
Ru-106	7.6E-02	<0.05	1.1E-02	2.8E-01
Rh-106	7.6E-02	<0.05	1.1E-02	2.8E-01
I-129	3.9E-02	<0.05	3.2E-03	1.7E-01
Cm-242	2.8E-02	<0.05	2.0E-03	1.3E-01

Table 3-25a. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Pu-239	2.6E-02	<0.05	1.9E-03	1.2E-01
Pu-238	2.5E-02	<0.05	1.8E-03	1.2E-01
U-234	2.1E-02	<0.05	8.1E-03	4.4E-02
U-238	1.7E-02	<0.05	8.1E-03	3.2E-02
Am-241	1.4E-02	<0.05	1.1E-03	6.2E-02
Cm-244	1.2E-02	<0.05	8.8E-04	5.9E-02
Cr-51	6.2E-03	<0.05	3.4E-04	3.2E-02
Pu-240	4.4E-03	<0.05	3.2E-04	2.1E-02
Nb-94	5.5E-04	<0.05	3.9E-05	2.6E-03
Np-237	4.0E-04	<0.05	2.8E-05	1.9E-03
U-236	2.6E-04	<0.05	1.3E-04	4.6E-04
U-235	1.4E-05	<0.05	7.4E-06	2.6E-05
Total	5.1E+02	100.0		

a. "Other" generators include ALE, ARA, CEG, CFA, D&D, ERP, PBF, WER, and WMC; however, ALE and CEG are not expected to contribute to the activity for 1994–2003 and PBF's waste is projected to contain minuscule amounts of radioactivity.

Table 3-25b. Inventory of radiological contaminants (listed alphabetically) from other generators for the years 1994–2003 (activity at time of disposal).^a

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Ag-108	1.6E-01	<0.05	5.2E-03	9.4E-01
Am-241	1.4E-02	<0.05	1.1E-03	6.2E-02
Ba-137m	1.1E+00	0.2	5.4E-03	7.7E+00
C-14	3.9E+00	0.8	2.7E-01	1.8E+01
Ce-144	2.1E+01	4.2	1.6E+00	9.9E+01
Cm-242	2.8E-02	<0.05	2.0E-03	1.3E-01
Cm-244	1.2E-02	<0.05	8.8E-04	5.9E-02
Co-58	7.1E-01	0.1	4.2E-02	3.5E+00
Co-60	1.9E+02	37.6	8.3E+01	3.8E+02
Cr-51	6.2E-03	<0.05	3.4E-04	3.2E-02
Cs-134	1.9E+00	0.4	2.1E-01	7.5E+00
Cs-137	8.8E+01	17.3	4.5E+01	1.6E+02
Eu-152	6.9E-01	0.1	3.8E-02	3.5E+00
Eu-154	8.5E-01	0.2	5.1E-02	4.2E+00
Eu-155	3.2E+00	0.6	2.5E-01	1.5E+01
Fe-55	1.6E+00	0.3	7.3E-01	3.0E+00
H-3	2.3E+01	4.6	1.8E+00	1.1E+02
I-129	3.9E-02	<0.05	3.2E-03	1.7E-01
Ir-192	1.4E+00	0.3	1.4E-01	5.7E+00
Mn-54	4.5E-01	0.1	2.8E-02	2.2E+00
Nb-94	5.5E-04	<0.05	3.9E-05	2.6E-03
Ni-59	1.5E-01	<0.05	1.1E-02	7.1E-01
Ni-63	1.3E+02	26.2	5.5E+01	2.8E+02
Np-237	4.0E-04	<0.05	2.8E-05	1.9E-03
Pr-144	5.0E-01	0.1	6.7E-02	1.9E+00
Pu-238	2.5E-02	<0.05	1.8E-03	1.2E-01
Pu-239	2.6E-02	<0.05	1.9E-03	1.2E-01

Table 3-25b. (continued).

Radionuclide	Best estimate (Ci)	Percent of total (%)	Lower bound	Upper bound
Pu-240	4.4E-03	<0.05	3.2E-04	2.1E-02
Pu-241	3.9E+00	0.8	2.7E-01	1.8E+01
Rh-106	7.6E-02	<0.05	1.1E-02	2.8E-01
Ru-106	7.6E-02	<0.05	1.1E-02	2.8E-01
Sb-125	3.6E+00	0.7	2.7E-01	1.7E+01
Sr-90	1.6E+01	3.2	2.5E+00	5.8E+01
Tc-99	8.3E-02	<0.05	5.9E-03	3.9E-01
U-234	2.1E-02	<0.05	8.1E-03	4.4E-02
U-235	1.4E-05	<0.05	7.4E-06	2.6E-05
U-236	2.6E-04	<0.05	1.3E-04	4.6E-04
U-238	1.7E-02	<0.05	8.1E-03	3.2E-02
Y-90	1.1E+01	2.2	1.5E+00	4.3E+01
Total	5.1E+02	100.0		

a. "Other" generators include ALE, ARA, CEG, CFA, D&D, ERP, PBF, WER, and WMC; however, ALE and CEG are not expected to contribute to the activity for 1994–2003 and PBF's waste is projected to contain minuscule amounts of radioactivity.

References for Section 3

- Bartolomucci, J. A., 1989, letter to J. N. Davis, "Curie Content Estimates for ECF Scrap Casks," NRFE-E-1448, Naval Reactors Facility, February 27, 1989.
- Charter, J. L., 1993, "Radioactive Waste Forecasts—Naval Reactors Facility," letter NRFRC-RCE-2247, November 15, 1993.
- Clements, T. L., Jr., 1980, *Buried Waste Characterization: Nonradiological Hazards Study—Offsite Waste Generators*, PR-W-80-027, EG&G Idaho, Inc., October 1980.
- EG&G Idaho, 1985, *Solid Waste Management Information System (SWMIS) SWMIS Users Manual*, EG&G Idaho, Inc., April 1985.
- EG&G Idaho, 1986, *Installation Assessment Report for EG&G Idaho, Inc. Operations at the Idaho National Engineering Laboratory*, EGG-WM-6875, EG&G Idaho, Inc., January 1986.
- Harker, Y. D., 1995a, *Scaling Factors for Waste Activities Measured by G-M Method*, EDF-ER-WAG7-57, engineering design file, Lockheed Idaho Technologies Company, February 1995.
- Harker, Y. D., 1995b, letter to T. H. Smith, "I-129 Act. in TRA Sections of HDT and RPDT Reports," YDH-2T-95, Lockheed Idaho Technologies Company, April 1995.
- LITCO (Lockheed Idaho Technologies Company), 1995, *A Comprehensive Inventory of Radiological and Nonradiological Contaminants in Waste Buried in the Subsurface Disposal Area of the INEL RWMC During the Years 1952–1983*, INEL-95/0120, Rev. 1, formerly EGG-WM-10903, August 1995.
- Nieslanik, R. W., 1994, "Evaluation of NRF Radiological Waste Streams for Waste Sent to RWMC from NRF (1984–1993)," NRFEM-ER-1223, Naval Reactors Facility, July 11, 1994.
- Rich, B. L., S. L. Hinnefeld, C. R. Lagerquist, W. G. Mansfield, L. H. Munson, and E. R. Wagner, 1988, *Health Physics Manual of Good Practices for Uranium Facilities*, EGG-2530, EG&G Idaho, Inc., June 1988.
- Rodgers, A. D., 1986, letter to distribution, "Elimination of Lead from Low Level Waste," ADR-8-86, EG&G Idaho, Inc., June 24, 1986.
- Rodgers, A. D., 1987, letter to distribution, "Use of Lead in Low-Level Waste Packages Schedule Exception," ADR-46-88, EG&G Idaho, Inc., December 16, 1987.